

UNREAL ENGINE 5 ENVIRONMENTS

INSPIRING
CG ARTISTS

3D WORLD

3dworld.creativebloq.com
ZBrush Magic
#287

**CREATE
STRIKING
SCULPTS**

with our step-by-step
on Page 42

**TAKE YOUR CONCEPTS
TO THE NEXT LEVEL!**



**RETOPOLOGISE
YOUR BLENDER
PROJECTS**

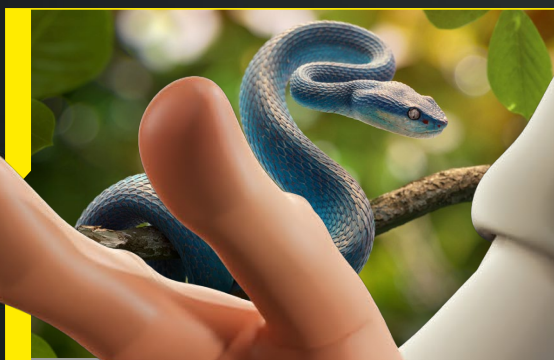
THE HISTORY
OF HOLOGRAMS

GEOMETRIC
PATTERNS IN
CINEMA 4D



REVIEW ROUNDUP

Discover new tech for your studio +
3ds Max & **Maya 2023** tested!



CONJURE STYLISED FAN ART

ZBRUSH MAGIC

Learn **top tips** for
character modelling
with our tutorial guide!

ALSO INSIDE

MECH MODELLING | ACQUISITIONS & MERGERS | STOP MOTION

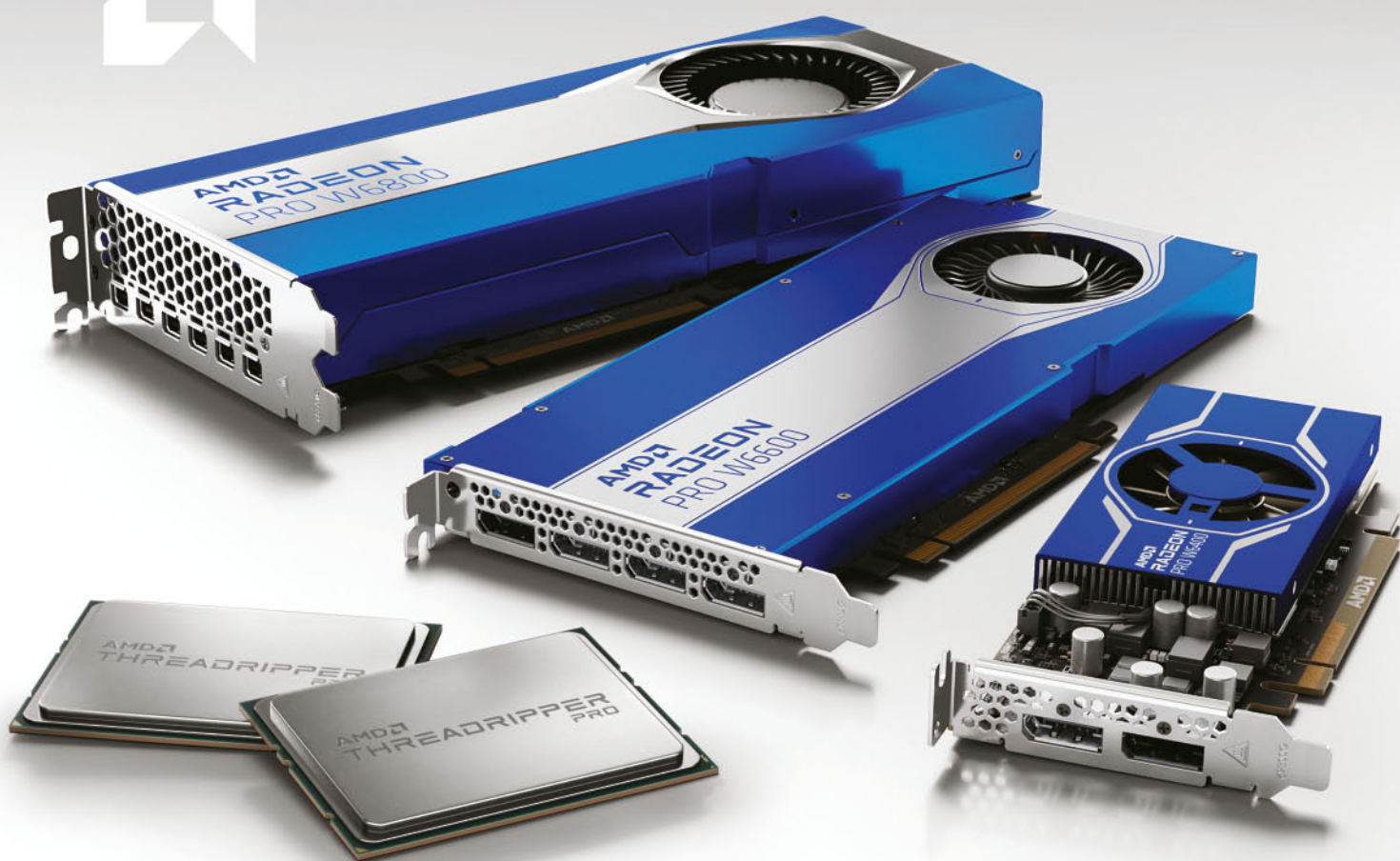
SMART PERFORMANCE. SMART PAIRING

Get the ultimate software experience with up to a gigantic 32GB of lightning-fast framebuffer, high-performing hardware raytracing, optimizations for up to 6 ultra-high res HDR displays, and superior multitasking capabilities. All wrapped around an award winning graphics architecture, called AMD RDNA™ 2 which is the proven graphics foundation for the leading, visually rich gaming consoles.

The latest AMD Radeon™ PRO W6000 graphics series is compatible with modern workstations offering additional optimizations for select AMD Ryzen™ based processors, harnessing the GPU's and system's full performance potential.



amd.com/RadeonPRO



WELCOME

This issue we start by taking a look at the 3D industry and community as a whole, looking at the way various developers have merged or been acquired, to check out the benefits (or otherwise) to artists and studios. The market is a quickly developing scene and knowing the future of our chosen software can have a big effect on how we develop our skills.

With that in mind we also dive into Epic's latest release of Unreal Engine, to help you master its tools. If that isn't enough we also show you how to create mechs in Maya, and rework your meshes in Blender, for best topology.

And if you're looking for a new 3D app, check our reviews of the latest Maya and 3ds Max releases.

Rob

Rob Redman, Editor
rob.redman@futurenet.com



COVER ARTIST
Guilherme Luis
de Oliveira Silva
SOFTWARE
ZBrush, Blender

CONTENTS

ARTIST SHOWCASE

6 The Gallery

Discover the best digital art from the CG community

40 Tech Focus: Atmospheric lighting

Beautiful environment work by Sady Fofana

72 Tech Focus: Model in virtual reality

How Sergey Grechanyuk utilised Gravity Sketch for face studies

FEATURES

22 The age of acquisitions & mergers

With large corporations swallowing up smaller companies and acquiring their software, what impact does this have on the 3D industry as a whole? We analyse and explore the positive and negative implications

32 Serious Play

We chat to the founder of award-winning animation company

Yamination Studios about their ongoing growth and excitement for future technologies

THE PIPELINE

42 Render a striking 3D character

This month's cover artist shares his techniques for creating a stylised character render

48 Create concept art in Unreal Engine 5

How to design and build a beautiful environment with the help of Unreal Engine 5

54 Retopologise in Blender

A quick guide to retopology in Blender, utilising the handy RetopoFlow add-on

60 Model a mech from concept art

Learn how to effectively work from concept art, overcoming the challenges to produce a stunning 3D render

42



22





94

SIGN UP!

For content direct to your inbox, subscribe to our weekly newsletter at:

bit.ly/3Dworld-newsletter



BREAKING THE SYMMETRY IS AN EXTREMELY IMPORTANT STEP TO MAKE MODELS LOOK LESS ARTIFICIAL

48



ARTIST Q&A

66 Your CG problems solved

Our team of pro artists tackle your queries

THE HUB

74 The history of the hologram in pop culture

A look back at the evolution of holographic tech, and what to expect in the future

78 The art of CG battles

We learn how BlueBolt tackled the intense VFX for the final season of *The Last Kingdom*

80 Day in the life

Filmmaker Jason B Milligan breaks down a typical day on and off set, working on a variety of production projects

82 Fan-favourite villains return

Digital Domain talk bringing Doc Ock back for a modern audience in *Spider-Man: No Way Home*

60



REVIEWS

86 Maya 2023

A look at the new features and upgrades within this latest release of Maya

88 3ds Max 2023

What does this new 3ds Max update have to offer?

90 Wired2Fire Apollo WS

We test and review this video editing workstation

92 Huion Q11K pen tablet

A budget tablet with a generously sized drawing surface

94 Acer ConceptD 7 Ezel Pro

A novel alternative to a clamshell laptop with a nifty design

REGULARS

30 Subscriptions

Subscribe and save!

96 Back issues

Complete your collection today

98 Free downloads

Images and files from our tutorial section

SAVE UP TO
66%
ON YOUR ANNUAL SUBSCRIPTION!



The Gallery

The best digital art from
the CG community





LITTLE GIRL AND ROBOT

BULLET 3



ARTIST

MUNABU

SOFTWARE

ZBrush, Blender,
Photoshop

“This work is the third shot in my ‘Little Girls and Robots’ series. From 2D design to 3D completion, I tried a lot of software effects using ZBrush, Blender and Photoshop. I would like to thank Mr. CrazyJN for his guidance.”

● artstation.com/munabu

THE TEAL WHEEL TAVERN

ORIGINAL CONCEPT BY JOURDAN TUFFAN



ARTIST

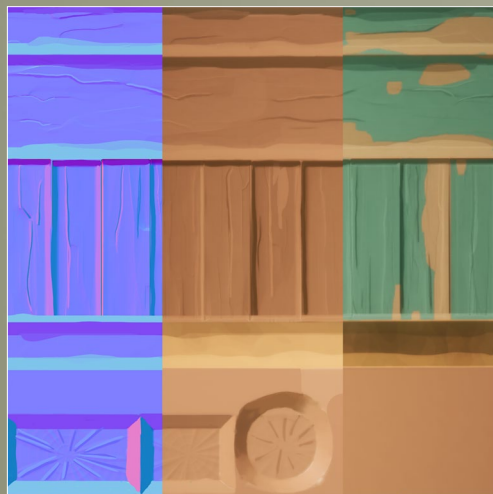
Lotte de Brabander

SOFTWARE

Blender, Substance Painter, Substance Designer,
Unreal Engine 5, Photoshop

“Recreating Jourdan Tuffan’s beautiful concept in 3D allowed me to practise with trim sheets, which was something I hadn’t had the chance to do in prior projects yet. So with the guidance of Lucas Annunziata, who mentored me throughout this project, I finally managed to cover that knowledge gap! My favourite part in the project was definitely playing around with Substance Designer, which I also used to make my trim sheet. It is so much fun to experiment with different nodes and trying to reach certain results, while never losing your progress! I think about 75% of the textures in my scene use either the trim sheet or a tiling texture, so I highly recommend any environment artist to look into it!”

● artstation.com/lotteb



Build your scene up as a whole instead of focusing on one asset at the time. Assets don’t have to be perfect right away, just keep on iterating!





IT IS SO MUCH FUN
TO EXPERIMENT WITH
DIFFERENT NODES AND TRY
TO REACH CERTAIN RESULTS

THE BEAST TITAN FAN ART

“I’ve been a huge fan of the *Attack on Titan* anime series and the Beast Titan was my favourite character so far, so I’ve decided to take a realistic approach while keeping the main features from the anime and manga.

I used XGen for the hair and fur grooming, with more than 1,200 guides for controlling the hair shape and flow. The hardest challenge for me was to light the beast, making it intimidating and creepy at the same time. I used Arnold environmental light then added a key light from above to create a gloomy feeling. Finally I added another three area lights around it, with a lot of blockers in order to fix unwanted light on the fur.”

● [artstation.com/
bassem_wageeh](http://artstation.com/bassem_wageeh)



ARTIST

Bassem Wageeh

SOFTWARE

ZBrush, Maya,
Substance Painter





Tell a story with your character's appearance and features. Make a lot of layers and morphs while sculpting in ZBrush, as it creates cool new ideas



I PUT A LOT OF EFFORT INTO
POST-PROCESSING, INCLUDING
ATMOSPHERIC EXPRESSIONS
USING ZDEPTH MAPS



OLD MORNING

■ The motif was inspired by Shitamachi Tokyo in the 1950s. The main character is a liquor store owner working on a cold winter morning. The buildings and trucks were modelled in Maya, and the snow on the ground was done in ZBrush.

All textures were created with Substance Painter. I also put a lot of effort into post-processing in Photoshop, including atmospheric expressions using Zdepth maps. ■

● artstation.com/kobayas



ARTIST
Taichi Kobayashi

SOFTWARE
Maya, V-Ray,
Substance Painter,
Photoshop, ZBrush

KAL2000

■ Making KAL2000 was fun and something of a challenge because of his complexity. I have been inspired by Mr. Marco and Mr. Cedric, owners of Keos Masons. They have intense mech designs, so I wanted something in that direction.

Something unusual for me is to use ZModeler to create complex parts from basic shapes; I generally use DynaMesh for conceiving, as it helps to get the look with a low poly count and is very flexible to change main shapes and silhouette. The process is long as you need to work in stages and layers to add complexity – there are around 84 subtools! But it's worth it. I enjoyed creating the IMMs and the conceiving stage the most, as getting the design done is the most interesting part – the rest of the work is technical and laborious. ■■

● artstation.com/jaymehta



ARTIST

Jay S Mehta

SOFTWARE

ZBrush, KeyShot,
Photoshop



FREE! OVER 2 HOURS OF EXCLUSIVE PRO VIDEO TRAINING

NO.1 FOR DIGITAL ARTISTS **ImagineFX**

THE ART OF **DUNGEONS & DRAGONS**

DISCOVER THE ARTISTS
WHO ARE BRINGING THE ICONIC
ROLE-PLAYING GAME TO LIFE!

17

**SPECTACULAR
D&D SKETCHES**
TO FIRE UP YOUR
IMAGINATION

IN-DEPTH

INSECT ANATOMY

Quickly paint realistic
creature art in Procreate



PRO INSIGHT

HOW TO WORK COLLABORATIVELY

Illustrators Raide and Leffie
create charming animal designs

ALSO INSIDE

**EXPLORE A JUNGLE STUDIO
- WATCH OUT FOR SNAKES!**

TAKE YOUR REFERENCES
TO THE NEXT LEVEL

**ABSTRACT ART ADVICE
WITH KEN COLEMAN**



RALPH HORSLEY REVEALS 25 ESSENTIAL TIPS TO IMPROVE YOUR FANTASY ART

ON SALE NOW! PRINT AND DIGITAL EDITIONS AVAILABLE AT

magazinesdirect.com

Digital editions are also available on iOS, Android, and more



Available on
kindle fire





ARTIST

Joel Wynd

SOFTWARE

Unreal Engine 5, Maya, ZBrush, Substance Designer/Painter/3D Sampler, Photoshop, Quixel, Marvelous Designer

ROACH CITY

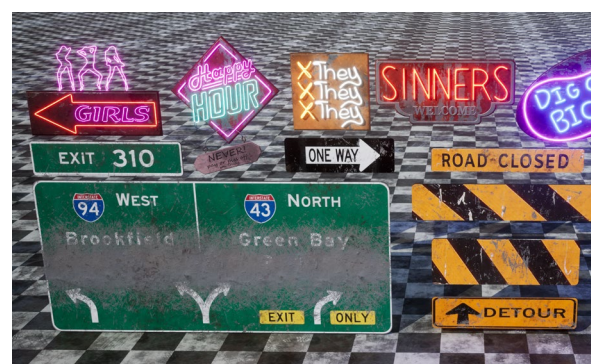
INSPIRED BY SERGEY VASNEV'S 'EVENING SLUMS'
(WWW.ARTSTATION.COM/ARTWORK/BMAKAR)

“Roach City is a fully traversable game level created in Unreal Engine 5. My intention behind this project was to create not only something pretty, but also functional.

To this end I made sure all areas in the level are accessible by creating proper collision volumes and focusing my efforts on highlighting player route options. This was done by creating larger walkways for the central path, using lighting to draw the eye towards areas of interest or possible routes throughout the level.

The creation process for this project was different from any other I've previously worked on, as I was using a Nanite workflow and implemented a Material Layer Stack setup inside Unreal for texturing. This process allowed for higher fidelity models and textures as I was not limited by poly count or UV space.”

● artstation.com/joelwynd







ARTIST
Pablo Munoz Gomez
SOFTWARE
ZBrush, Blender,
Substance Painter,
Substance 3D Stager,
Marmoset Toolbag 4,
Rizom UV, Photoshop,
Marvelous Designer

THE ONE WITH NO NAME

“This character was the project for the month of February 2022 on my 3DSnippets.com website. I used it as an example to explore various workflows between software, and to create custom assets like fabric materials and sculpting brushes for cloth and drapery.”

● pablander.com

WHEN WORKING ON A DESIGN
WHERE YOU WANT TO ADD A LOT
OF DETAILS, KEEP IN MIND THAT
THE 'EMPTY' AREAS ARE EQUALLY
IMPORTANT TO BALANCE
THE COMPOSITION



THE ARTIST - BFG

SOFTWARE Blender, ZBrush, Maya, RizomUV, Substance Painter, Photoshop, XGen, Arnold
YEAR CREATED 2022

I like creatures and unique characters with unusual scales, like Thanos, Smeagol and the BFG. It has always been a special moment when I see them come to life in theatre. Lately I've learned new techniques and earned new skills that I wanted to apply on a personal project, so I tried to mix all of this together, and the BFG world was my choice for that. So in a world of giants and humans, there should be a giant artist.

● www.therookies.co/u/SalahElshehry



ARTIST Salah Elshehry

LOCATION Egypt

I'm a self-taught 3D character and creatures artist, who entered into the field of 3D in 2019 as a fan, watching step-by-steps. I now have one year of professional experience.



THE
ROOKIES

The Rookies is a platform to help digital artists get discovered without having to compete with professionals for attention. You'll get to the front page of those sites one day, but for now, we've got your back and want to help turn your passion for creative media into a successful career.

WWW.THEROOKIES.CO

Right: *Cygni: All Guns Blazing* (bit.ly/3kH6vHV), an upcoming debut game from Scottish developers KeelWorks has benefited from the generosity of Epic MegaGrants
© Konami Digital Entertainment

The age of acquisitions & mergers

Is it the beginning of the end for small & innovative companies?

WORDS BY PAUL HATTON

The 3D industry is no stranger to small companies being swallowed up by giant monolithic corporations. We've seen it time and again. Maybe the most prolific example is Autodesk – this multinational software company has made a huge number of acquisitions over its 40-year history, and this focused effort to acquire so many companies certainly has its impact on the industry.

The more notable examples for Autodesk were when they bought Maya in 2006, Mudbox in 2007 and Avid Softimage in 2008. These three in such a short period of time made Autodesk the owner of a range of packages that set them apart as the leading provider of 3D digital content creation software. They went from being one of the players, with 3ds Max as their main offering, to being the owner of a broad range of the 3D packages on the market at the time. It was game-changing.

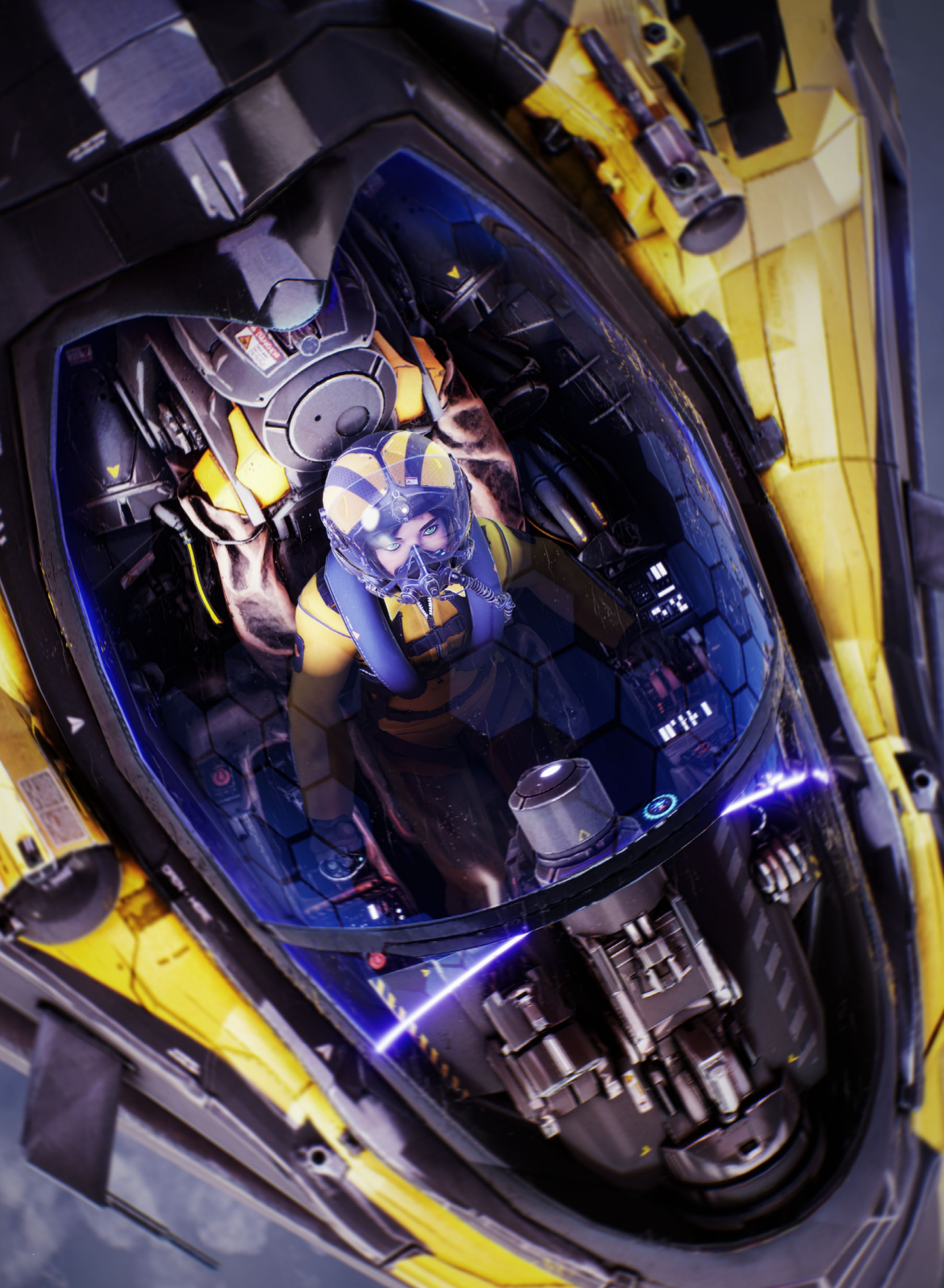
Another company that has made the headlines for acquisitions and mergers is Maxon, the developer of Cinema 4D. Not satisfied with this package, they acquired Redshift in 2019, merged with Red Giant

in 2020 and earlier this year, in 2022, they acquired Pixologic Inc. and with it ZBrush. The Maxon family of products is becoming increasingly formidable.

We could mention many significant acquisitions in the world of 3D, but this all begs the question of how this is affecting not only the industry itself, but also the 3D community that uses these tools. Let's take a look at the pros and cons before discussing the impact on the industry and its community more broadly.

ADVANTAGES

One of the immediate benefits to larger companies buying other software is that those applications end up better and quicker. With most applications now running subscription pricing models, this means that you'll get any improvements included within your monthly/annual fee. Companies are always trying to stay ahead of their competitors, so are keen to keep their offerings ahead of the curve when it comes to new features and technological developments. Utilising the hard work put in by other companies enables them to deliver more improved software in a fraction of the time. >





➤ Chaos serves as a great example of how acquisitions and mergers can strengthen companies. By acquiring Corona Renderer and Cylindo, Chaos have moved from being just one renderer in the midst of a plethora of alternatives to being a leading end-to-end 3D visualisation ecosystem, or at least getting close to it. Chaos could probably have set up their own platform for visualisation and commerce, but it would have taken a long time and with the competition in this industry getting fiercer every year, there was no time to waste.

Moving away from acquisitions, Chaos merged with Enscape at the start of 2022, which has no doubt made them both stronger. Now with the backing of one another, they can move towards the same vision with greater speed and focus. Aside from Chaos, we've also seen other companies such as Autodesk go from strength to strength, and each year as it acquires more and more it becomes almost invincible. Even if we may not agree with many of these takeovers, there is no denying that they do make the purchasing companies even stronger.

We'll talk about innovation when we discuss the potential downsides, but it also belongs in our consideration of the positives. When small companies with limited budgets get swallowed up into a much bigger company, they

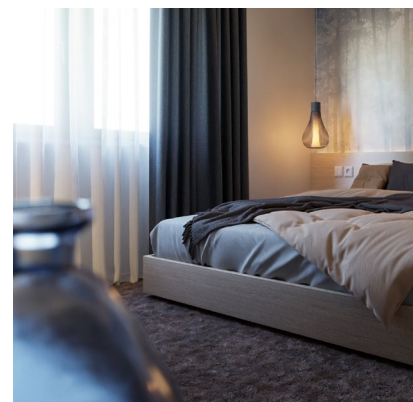
“THERE ARE LESS COMPANIES FIGHTING FOR MARKET SHARE AND THUS, A POTENTIAL FOR LESS MOTIVATION FOR COMPANIES TO KEEP INNOVATING”

often get access to more money and more skill. This isn't always the case, but if the purchasing company sees a big and bright future for the software they've bought, then they'll be keen to put their money where their mouth is and make sure they get the resources they need for development. For small companies with big dreams, being bought out is sometimes the only way for them to realise their visions.

Last up in our pursuit of the positives is the reality that big-money acquisitions can encourage and motivate start-ups to get going in the first place. By creating a product with a USP that drives the industry forward, there's a chance to grab the attention of the big players. This can be enough to drive some people to put in the long hours and risk everything to create game-changing software.

Above: CG generalist Darko Mitev rendered this highly detailed sci-fi scene, titled ORIS City, with V-Ray

Right: The 3D printing industry, in part, is benefitting from acquisitions that bring money to small innovative companies who lack the necessary capital to expand



DISADVANTAGES

But before we get too upbeat about the unstoppable momentum that these industry powerhouses seem to have built up, let's have a look at some of the disadvantages.

First up: there's fewer industry competition. There are less companies fighting for market share and thus, a potential for less motivation for companies to keep innovating. Aside from a company's desire to be the best, there is nothing that ensures continued growth, innovation and development better than companies competing against one another to stay ahead of the curve. This forces development teams to get creative in delivering new features and enhanced services, and this has been particularly evident in the rendering sector of the 3D industry. The likes of Mental Ray, V-Ray, Corona, Arnold

Boosting an entire industry

Acquisitions and mergers can make the impossible possible

The 3D printing industry is a relative newcomer to the 3D world, and in recent times is becoming much more commonplace, especially as it finds money-making applications across a variety of different sectors. This industry has seen a huge amount of innovation and development in a relatively short period of time, but it could be argued that some of these innovative companies have lacked enough capital to get proper traction. Without substantial investment, a good idea can struggle to become anything more, but with the right resources new technologies can find their place in the market.

In recent years we have seen Stratasys acquire MakerBot, GrabCAD and most recently Origin Inc. This latest purchase is driven by Origin's DLP (Digital Light Processing) technology and its ability to mass produce printed parts. This move will bring further strength to the 3D print industry and likely see an increase in usable applications for this technology.

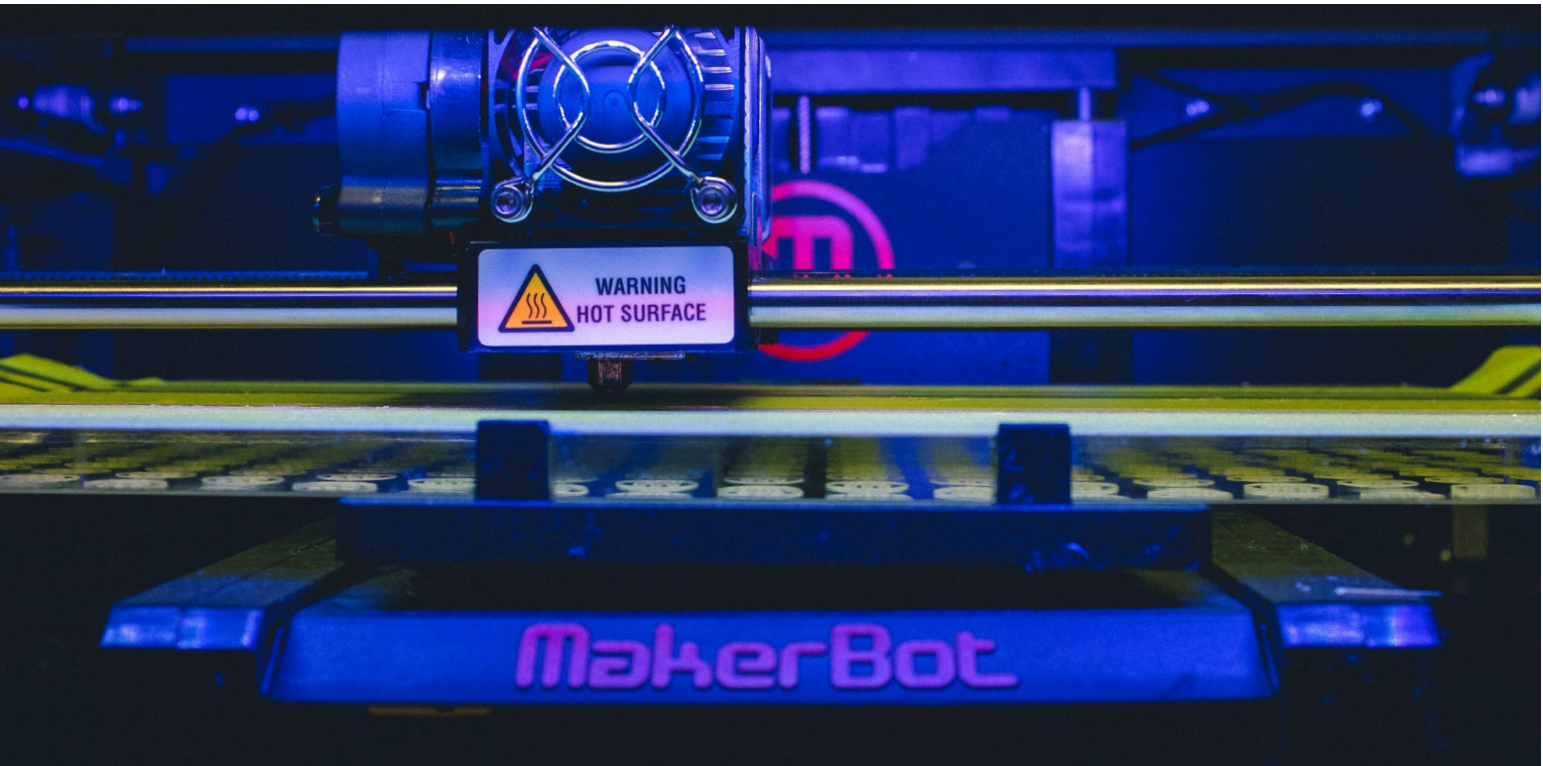
Below: Hrvoje Malinovic modelled and rendered this cosy bedroom entirely in Blender, which remains completely free and open source

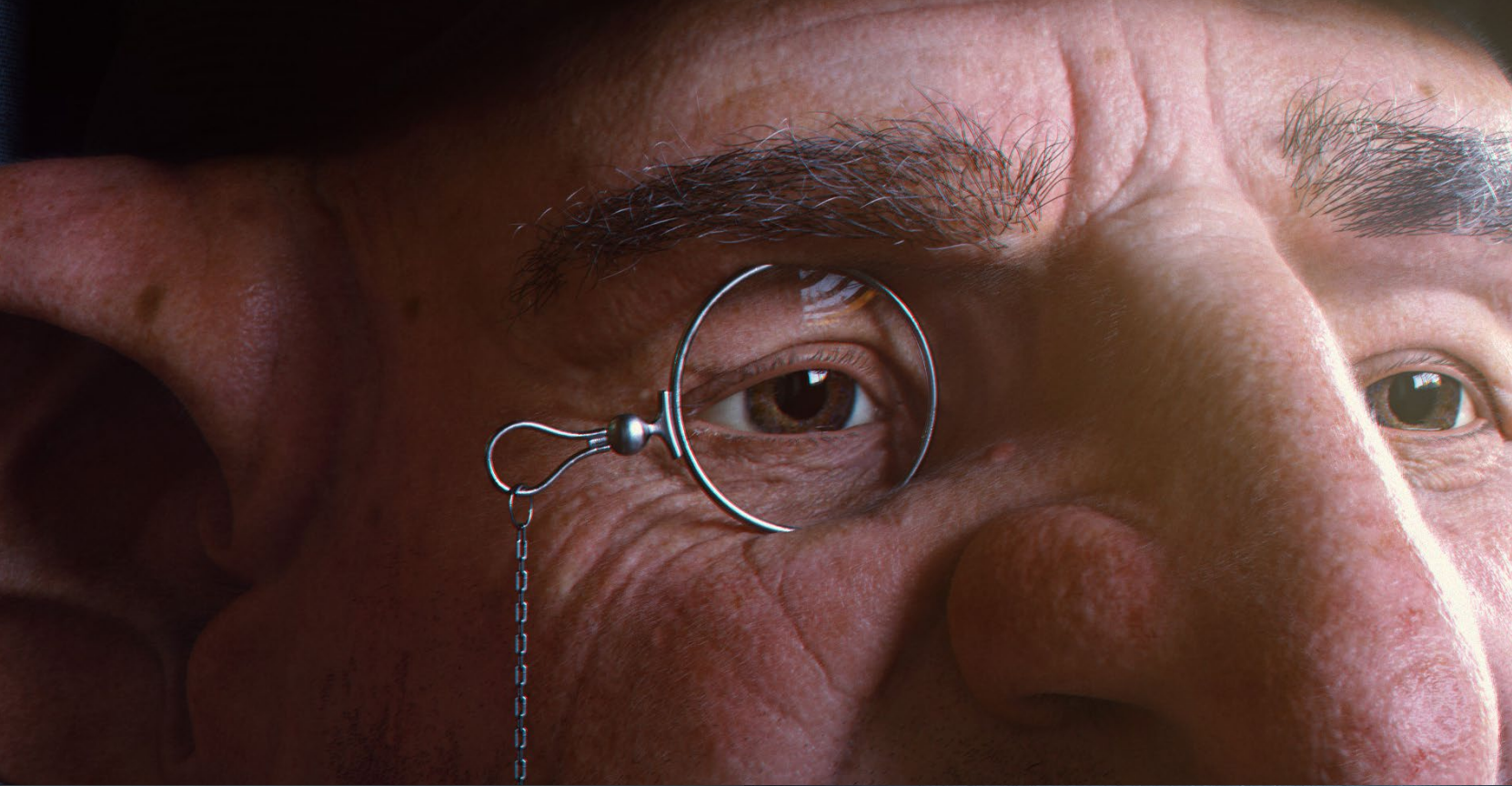
and Indigo – to name only a few – have pushed one another to make rendering both as realistic and as quick as possible. Without the presence of competitors to push each other, there would have been little motivation for any rendering company to carry out much research and development.

Secondly, some companies get bought out and then become obsolete as their plans and priorities change. An example of this was the artificial intelligence company Kynogon. It was created by Pierre Pontevia and Jacques Gaubil in 2000 before being developed for around eight years. In 2008 it was acquired by Autodesk and rebranded 'Autodesk Navigation'. In 2017 this piece of software was discontinued and

became obsolete. One wonders whether Kynogon would still be around if the original owners had continued with it, and how it might have evolved to meet the demands of our current day.

Thirdly, it can become increasingly difficult for small companies to get started because they simply can't compete with the development budgets and personnel resources of much more established companies. Unless an idea or a technology can be patented, there is nothing stopping the big players integrating new ideas from smaller start-ups into their packages. This could be considered a positive result for those who are tied into those applications, but it's not so good for those who are trying to find >







Above: *Cygni: All Guns Blazing* is due to release in 2023 © Konami Digital Entertainment

Right: Epic Grants are providing people with the money that will help them turn their ideas into reality. Julian Kobler Kennedy's 'Carnotaurus' could be the star of the next big indie game or film production!

Left: Darko Mitev uses Arnold Render to push his character work to the limit

➤ a way into the fierce market of 3D software.

Finally, when a small indie start-up gets taken over it often gets swallowed up into the bigger company's pricing structure. Once again, this is great for those who are already on subscription plans for the more established packages but, on the flip side, this is far from ideal for those artists who used to rely on the smaller package and its smaller price tag. Not every artist can afford the price tags associated with the larger companies.

IS THERE AN ALTERNATIVE?

In a capitalistic society where money is a core driving force, is there a feasible and realistic alternative to our present way of doing things? All of the major players are going to want to continue to increase market share

and strengthen their competitive edge. With that attitude, what will stop them from buying up smaller companies, either with the motivation to remove competition or make themselves more competitive in the process? And what will stop smaller companies feeling the urge to accept big payouts for their hard work when they can't guarantee that they'll be successful in the future? The long game doesn't always pay off. These are fascinating questions to consider, because they force an industry and its community to take a step back and review the direction it's going in.

One way we'll keep the 3D industry focused on its community is to keep celebrating and supporting open-source applications. Blender is a perfect example of that, being completely free and open source and owned ➤

Epic MegaGrants helping small companies

Supporting open source

Maybe Epic is leading the way here. In an attempt to support projects that solve tough problems or improve workflows, either within Unreal Engine or that enhance the open-source 3D graphics system, Epic now provides funding in the form of Epic MegaGrants. Ranging from \$5,000 to \$500,000 these grants are designed to push a variety of endeavours forward. These range from game development, architecture projects, and film production, to academic uses and software tool development.

One of the great things about these grants is that Epic doesn't hold any ownership rights over the entity they're providing the grant to. They benefit from the fact that the recipients of these grants will support the Unreal Engine community more broadly, but it's good that they are not getting involved in IP (Intellectual Property) considerations. This genuinely seems like a desire to move technology forward. Through this, Epic is creating a community-driven effort to ensure technological advances in the industry.



● Feature

The age of acquisitions and mergers

› by its contributors. This is made possible through the likes of donations and subscriptions to their Blender Studio platform.

The team at Blender believe that everyone should be able and free to create 3D content. To do this they don't have any financial hurdles that stop people from owning the software, and they have put the very development of the product in the hands of the community itself. This ensures that any progress made is done with the community's interests in mind. This collaborative approach lessens the focus on money and market share and is more concerned with developing the best technology, making it accessible, and getting it into the hands of artists around the world.

The more we can encourage open-source development in the 3D industry, the more we'll see the community driving it forward.

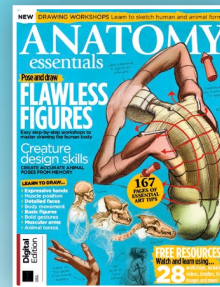
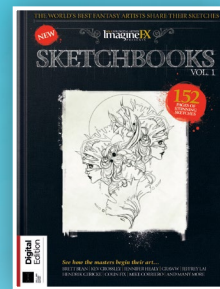
**“WE NEED TO
FIND WAYS TO
CELEBRATE
OPEN-SOURCE,
COMMUNITY-
DRIVEN
DEVELOPMENT”**

SUMMARY

There will always be mixed feelings about the direction of travel for the 3D industry and the part that acquisitions and mergers play in it. In reality, I think there is a place for everyone to get along. If we can find ways to celebrate open-source, community-driven development of applications, as well as encouraging small and innovative start-ups to drive the industry forward, then that'll be a win-win for everyone.

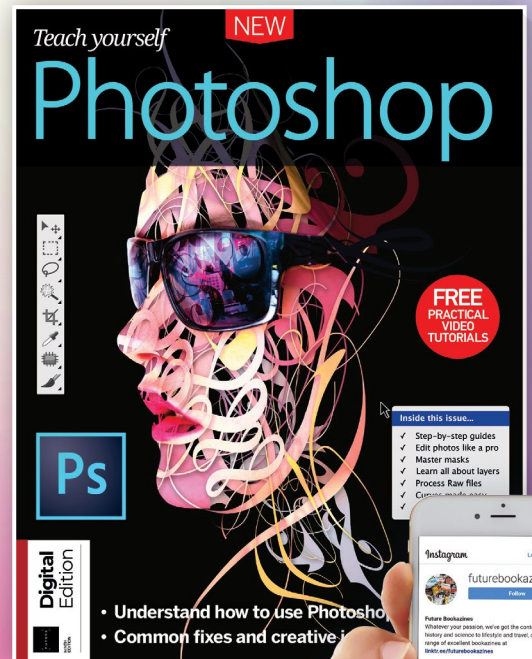
Right: This character by SiChen Lin pops with enthusiasm and energy. The jumper is expertly crafted for the character with Autodesk's 3ds Max





DISCOVER OUR GREAT BOOKAZINES

From crochet and quilting to painting and Photoshop, pick up a book that will take your hobby to the next level



Follow us on Instagram  @futurebookazines

www.magazinesdirect.com

Magazines, back issues & bookazines.

FUTURE



Head to page 48 to see the
making of Ellie Cooper's
Temple of Athena



SAVE UP TO
66%*
ON YOUR ANNUAL
SUBSCRIPTION!



SUBSCRIBE!

THREE OFFERS TO CHOOSE FROM!



Option 1: Annual print subscription, £45.43 a year*

- 13 issues of the 3D World print edition direct to your door
- No-hassle delivery
- Never miss an issue



Option 2: Annual print + digital subscription, £60.43 a year*

- 13 issues of the 3D World print + digital editions
- Instant access to digital edition via your iOS or Android device
- No-hassle delivery
- Never miss an issue



Option 3: Annual digital subscription, £45.43 a year*

- 13 issues of the 3D World digital edition
- Instant access to digital edition via your iOS or Android device
- Never miss an issue
- Gain insights from industry-leading 3D artists

SUBSCRIBE AND SAVE BY VISITING:
MYFAVOURITEMAGAZINES.COM/TDW/A44E
OR TELEPHONE 0330 333 1113 AND QUOTE A44E

*Terms & conditions Offer closes 30/6/2022. Offer open to new UK subscribers only. Pricing is guaranteed for the first 12 months and we will notify you in advance of any price changes. Please allow up to six weeks for delivery of your first subscription issue (up to eight weeks overseas). Your gift will be delivered separately within 60 days after your first payment has cleared. Gifts only available to subscribers on the UK mainland. Gift not available with a digital subscription. The full subscription rate is for 12 months (13 issues) and includes postage and packaging. If the magazine ordered changes frequency per annum, we will honour the number of issues paid for, not the term of the subscription. For full terms and conditions, visit www.magazinesdirect.com/terms. For enquiries please call: +44 (0) 330 333 1113. Lines are open Monday- Friday 9am- 5pm UK Time or e-mail: help@magazinesdirect.com. Calls to 0330 numbers will be charged at no more than a national landline call, and may be included in your phone provider's call bundle.

SERIOUS PLAY



3D World talks with Drew Roper, founder of Birmingham-based, award-winning animation company, **Yamination Studios**

Yamination Studios bring the *Toy Story* gang to life in its own stop-motion way for a TV commercial



Sitting in his office at Yamination Studios, an animation company specialising in stop-motion animation in Digbeth, Birmingham, Drew Roper says with quite some enthusiasm that post-lockdown, daily working life is “back to 100mph, but it’s nice to get back to some form of normality. It’s like things have started to kickstart in a stronger gear again.”

In establishing his studio, founded in 2009, Drew has stayed true to his West Midlands roots and has gradually seen Yamination develop, grow and enjoy recognition nationally and internationally. “I’ve had a lot of support and the talent that I get to work with makes us who we are,” Drew notes. “Every medium of animation and filmmaking enhances what we do. Stop motion is our forte but I love all animation and all filmmaking. That’s what filmmaking is: hybrid working.”

“EVERY MEDIUM
ENHANCES
WHAT WE DO...
THAT’S WHAT
FILMMAKING IS:
HYBRID WORKING”

Drew Roper, founder, Yamination

In talking about Yamination’s journey to date, Drew looks in the rear-view mirror and recalls, “I found it difficult to get work, so I thought ‘I’ll do my own work’.” In turn, Drew started getting his work and his name recognised and he ensured from the start that, alongside the animation itself, his energies were given to nurturing support, interest and investment in the studio. In those earliest days, Drew secured work on three major stop-motion movies in production in the UK: *Fantastic Mr. Fox*, *Frankenweenie* and *Shaun the Sheep*. Those projects became key, forming the basis of Drew’s network. In parallel with his work for hire ➤



OLD AND NEW TOGETHER

Drew explores the fusion of non-digital and digital processes at the studio

"We're utilising lots of digital platforms: 3D printing and 3D design that we can print and then build and utilise within a puppet for instance. There's lots of innovation and engineering going on with what we're doing and it's really fun. It starts digitally, and that's why it's quite fitting that we're speaking now as we're using that technology to enhance the stop motion. We've used motion control a lot. All of our cameras are linked to computers so that file management is all sorted. Everything gets put on systems through our digital workflow."



➤ in the earliest days, Drew notes that to try and secure a useful showcase for his work, "I applied to different initiatives." Among the initiatives that he applied to, and that had a favourable outcome, was a commission from Sky Arts to produce a short animated movie entitled *At-Issue*, which uses a combination of traditional 2D animation, CGI and stop motion. Drew remembers how the film "led to other, higher-calibre opportunities and connections." *At-Issue* was screened at 2016's BAFTA-qualifying Aesthetica Short Film Festival in York before going on to secure a nomination for the 'Best New Talent' award from the Royal Television Society.



Above: Yamination's founder Drew Roper animates a rod puppet

Left: At Yamination's studio in south Birmingham, models are designed and built for commercials, short films and other projects as the company continues to grow. Michael Price (left) and Jim Parkyn (right)

Drew recalls that in the wake of *At-Issue's* winning streak, "We started to take on more commercial work. We moved from The Custard Factory (in Birmingham) to a larger, new studio and I'm learning so many business lessons along the way."

Of his long-standing base in Birmingham, Drew is keen to make a point about the regional filmmaking and screen media scene in the Midlands. "I'm very proud of where we're from. It's nice to be here in Birmingham." For Drew, he's been able to watch an evolving group of filmmakers and screen media practitioners enriching the Midlands network, supporting each other with skillsets and knowledge. "It's

"WE'RE TRYING TO FIND WAYS TO ENHANCE INNOVATION, WHILE ALSO MAKING SURE WE STAY TRUE TO OUR ROOTS"

Drew Roper, founder, Yamination

a good time for the Midlands," he says, "in terms of types of investment that might be coming through." Drew cites the ambition of *Peaky Blinders'* creator to establish a major studio in the city as part of the possible future for Birmingham's creative industries.

Alongside Drew's ambitions around future series and feature

projects, he is also keen to remain connected to his filmmaking roots in terms of the short film format. "It's nice to be artistic and experimental," he says, "and you can then take that into a longer, more commercial format."

As part of the longer-term development for Yamination, Drew explains how the size of his staff is beginning to grow and how this reflects the increasing volume and scale of work being undertaken. For Drew, his focus is evermore on content development, commercials and exploring opportunities for the studio's own IP.

"We've got a few things in development," Drew notes of two series projects that he is shepherding along as part of a bigger game-plan. "It's back to the chaos of clay: we're full-on with commercials again. The requests and queries for more jobs are coming in thick and fast now. Plus, we're expanding: we're going to be moving to a new studio. We'd outgrown this space before COVID hit and we've just reserved the right to move, so now we're upscaling and going, which is really exciting."

"The projects that we're taking on at the moment are much bigger projects. We've upscaled the team: there's now ten of us. And with commercials, obviously, we expand the team as and when we need more crew to get the job done. This year's been a much better year than last for commercials." ➤

Left: Replacement heads await use for specific expressions required for a given character in a shot

● Feature

Yamination: Serious Play

➤ Over the past 13 years, Yamination has developed shorts and pilots, and produced TV commercials and promos for clients including Disney, Coca Cola, Cravendale, and the Roald Dahl Story Company.

“We specialise in stop motion but we’re open to all forms,” Drew explains of the Yamination brand. “Every form of animation is included in stop motion, and it’s really only the build section that’s particularly stop motion. We use digital software, and Adobe packages, to enhance our stop motion and we always need VFX artists to clean it up.” He notes, too, that “We can do 2D motion graphics, or a logo in CG. You should never turn down the work.” Pragmatic and idealistic all in one hit, Drew notes, “If you’re trying to tell a good story, it doesn’t matter what medium it is.”

Of Yamination’s current development slate, Drew explains: “We’ve got two very exciting TV shows that are in development: a pre-school show, and a 7-11 kids’ show which we’re doing in partnership as a Midlands co-production [with Threewise Entertainment]. They’re an independent company specialising in kids and family material. They have a fantastic mix of live-action and animation slates, of which we have a couple more really early development projects in with them, too. They’ve come to us to do this animation. We’ve also got a couple of other things that are in really early development.”

Drew adds, “There are still short film ideas I want to do, and long form. Once we get something in production, I can then build a bigger team to focus on more than that. I can then make sure all the other stuff starts churning again.”

As of right now, the studio continues to enjoy securing



Top: Stop motion in the creation of engaging characters is precisely rendered work as a figure is posed by Tom Edgar for Yamination Studios' short film, *My Daddy's Stinky Dancing Pants*

commissions to produce material for commercials. “We’re working on a commercial now that’s really challenging. And that’s exciting because we’re working with new media and new technologies to be able to change and enhance what we can do in stop motion and the capabilities that come with that.”

Drew touches on the fusion of traditional and new media in the studio’s work. “Everything still starts with design and paper. On this job, we’ve all pulled together to try and figure out how to make this commercial and how we’re going to make the design work. So, we’ve got an in-house junior creative who’s been amazing at designing stylised characters. Then what we have to try and do is almost figure out how on

earth we’re going to make that stylisation work. What’s nice about it is that we’ve started by drawing digitally, then we went back to paper and from paper we went back to digital trying to work out some elements for things, because it just felt a bit more organic to do it that way. And then we’ve gone digital.

“So, we’re using these digital designs to turn into some sort of 3D model. They’ll be printed, and then we’ll attach some things that we’ll physically make, so they all come together nicely. There’s lots of natural nuances that happen with digital technology and traditional animation. And that’s what we are, really: trying to find ways to enhance innovation but also making sure we stay true to ➤

“THE IDEAS WE’RE TRYING TO TELL ARE NEW, INNOVATIVE... AND POWERFUL MESSAGES FOR THE NEXT GENERATION”

Drew Roper, founder, Yamination

THE SPIRIT OF COLLABORATION

Drew discusses Yamination's work with other studios to develop creative production approaches

"We're doing a lot of what we can in-house, but again, you have to work with other suppliers, and other more experienced companies, to enhance skills. Working with other companies, it's exciting. For one of the two shoots we're currently doing here, we're utilising new technologies: we're thinking about 3D-printed faces and so we're working with another local creative, visual effects and previz company, Bigtooth Studios based in Staffordshire, and we've wanted to work on something together for ages. I've got these lovely designs and now we've turned them into sculptures, into resin models, and then had them 3D-scanned

by another local company. You can take these 3D elements and the scans and cut the face off and then we can start figuring out redesigning the face from that. We can then print these faces so that we can do face replacement. We've done some tests on the characters to give them more personality. We're about to start really getting into that one. Everything's done our end, stop-motion wise and now it's all about seeing what digital elements we can perfect. Then we'll get those printed and sanded and painted and whatever else. There's a nice balance of digital and traditional in the studio and I can't wait to show people."



Amongst Yamination's commercial work has been a series of adverts for Disney

● Feature

Yamination: Serious Play

our roots to ensure that you get that desired and nostalgic stop-motion feel.”

Looking further ahead, Drew makes it clear that his ambition for Yamination is for the studio to “uphold a reputation and skill level that sits very nicely alongside some incredible other businesses.” Drew knows that will take time. “The fact we’re still going is positive. 2021 was our toughest year because we also invested a huge amount of time and resources in developing a high-end animation slate of projects to be proud of.”

He continues: “I’m ambitious and optimistic and we’ve got to start developing our own IP that’s

Below (left):
Founder Drew Roper at
work on set

Below (right):
Yamination’s artists,
Fung Ye Tsang (left) and
Laura Watson (right),
at work on design for
a commercial

Bottom: A completed
stop-motion character
ready for its close-up

fun and imaginative. When we’re on a commercial, that takes up a lot of our time. We’re a small team with big ambitions.” Drew then continues to elaborate on how the work the studio was producing several years ago provided a spark in terms of how to approach its future. “We’re trying to build on our reputation and we are establishing ourselves in the entertainment sector now. The things that we did with the Roald Dahl Story Company were an amazing eye-opener for me.”

Discussing the studio’s own internally developed projects, Drew says, “The ideas we’re trying to tell are new, innovative, appealing, relevant, exciting and

playful, telling powerful messages for the next generation of children and young people. We’re still welcoming service projects, too. If we continue to do our own projects, too, that’s a dream come true.” He laughs and adds: “And to do it as nicely, creatively and politely as we can.”

Drew pauses before concluding our conversation on two heartfelt notes. “I feel very blessed in the Midlands that we’ve got such a diverse community of talent.” He then smiles and says: “My inspiration was Walt Disney. I always wanted to be Walt Disney... or a footballer.” Drew pauses and then adds: “I own and run a studio because of an idol.”

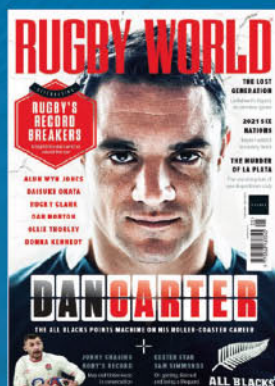
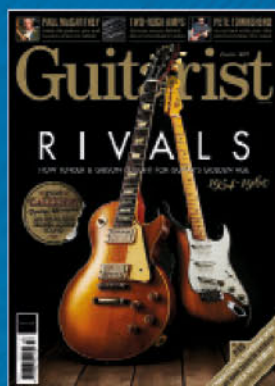
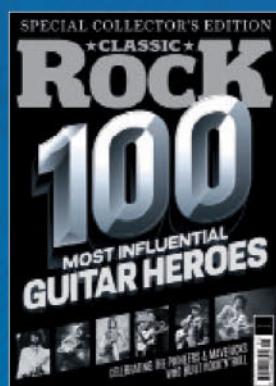


© Arla / Blinkink



© Ian Davies Photography





FATHER'S DAY SUBSCRIPTION OFFER

EXTRA 10% OFF

- Make his day with the gift that keeps on giving
- He'll never miss an issue of his favourite magazine
- Free delivery included

SEE THE FULL SUBSCRIPTION RANGE AT
www.magazinesdirect.com/DAD

Or phone 0330 333 1113 and quote code **FD22**

Terms and Conditions: Offer closes 30th June 2022. Offer open to new subscribers only. Direct Debit offer is available to UK subscribers only. After your trial issues, your subscription will continue at the price shown at the point of purchase. Saving is based on full subscription rate. We will notify you in advance of any price changes. Please allow up to six weeks for delivery of your first subscription issue (up to eight weeks overseas). If the magazine ordered changes frequency per annum, we will honour the number of issues paid for, not the term of the subscription. Payment is non-refundable after the 14 day cancellation period unless exceptional circumstances apply. Selected magazines are available on this introductory offer and exclusions apply. For full terms and conditions, visit www.magazinesdirect.com/terms. For enquiries please call: +44 (0) 330 333 1113. Lines are open Monday-Friday 9am-5pm UK Time (excluding Bank Holidays) or e-mail: help@magazinesdirect.com. Calls to 0330 numbers will be charged at no more than a national landline call, and may be included in your phone provider's call bundle.

Technique focus

Incredible 3D artists take us behind their artwork

ATMOSPHERIC LIGHTING When creating the outpost I used an existing set of building pieces from my personal WIP kitbash library. From there I used a series of greebles and building parts to create the silhouette shapes on the upper parts of the building. For the lighting I used area lights and sunlamps to capture a strong silhouette look for the greebles, while getting the lower parts of the image to have a orange hue. To ensure that bright yellow atmosphere contrasted with the roof bits, I used an area light with a set volumetric/emission distance to get the horizon effect, while at the same time keeping the orange look.

My inspiration for the lighting stemmed from the desert scenes from *Blade Runner 2049*. I got great feedback along the way and over time achieved the look I was shooting for. The thing I was most picky about were the vistas: I used a series of layering terrain and volumetric techniques to get a vast sense of distance from the outpost to the background, and for the rocks I used a few photoscanned ones from textures.com, tinting the colours to match to the scene.



Sady Fofana
artstation.com/vertexpolyfort

Hard-surface/
environment artist, 3D
printing enthusiast and
long-time fan of the
sci-fi genre. I have a
passion for real-time
sci-fi environments in
games and movies.

DERELICT OUTPOST

Software Blender, Substance Designer

Year made 2022



The Pipeline

Practical tips and tutorials from
pro artists to improve
your CG skills

ZBRUSH | BLENDER

RENDER A STRIKING 3D CHARACTER

This month's cover artist breaks down his process and techniques for creating this magical Gandalf model

In this tutorial, I will show you the main techniques I use to build a character based on a concept. I'll focus on the blocking step and how important it is to organise your model properly. What makes a good model for me is its foundation, its ability to be beautiful without texturing and complex lighting. In this guide, I am not going to focus on modelling specific elements, but on building an object as a whole using simple techniques and simple brushes.

This is not a model meant for animation or production, so you can take some liberties to create something visually beautiful. For modelling I will be using ZBrush, but the concepts taught can be replicated in the 3D software of your choice, just a few tools will need to be adjusted. Do not feel limited by the techniques taught here, but add to them and adapt them to your workflow and what you want to create.



AUTHOR

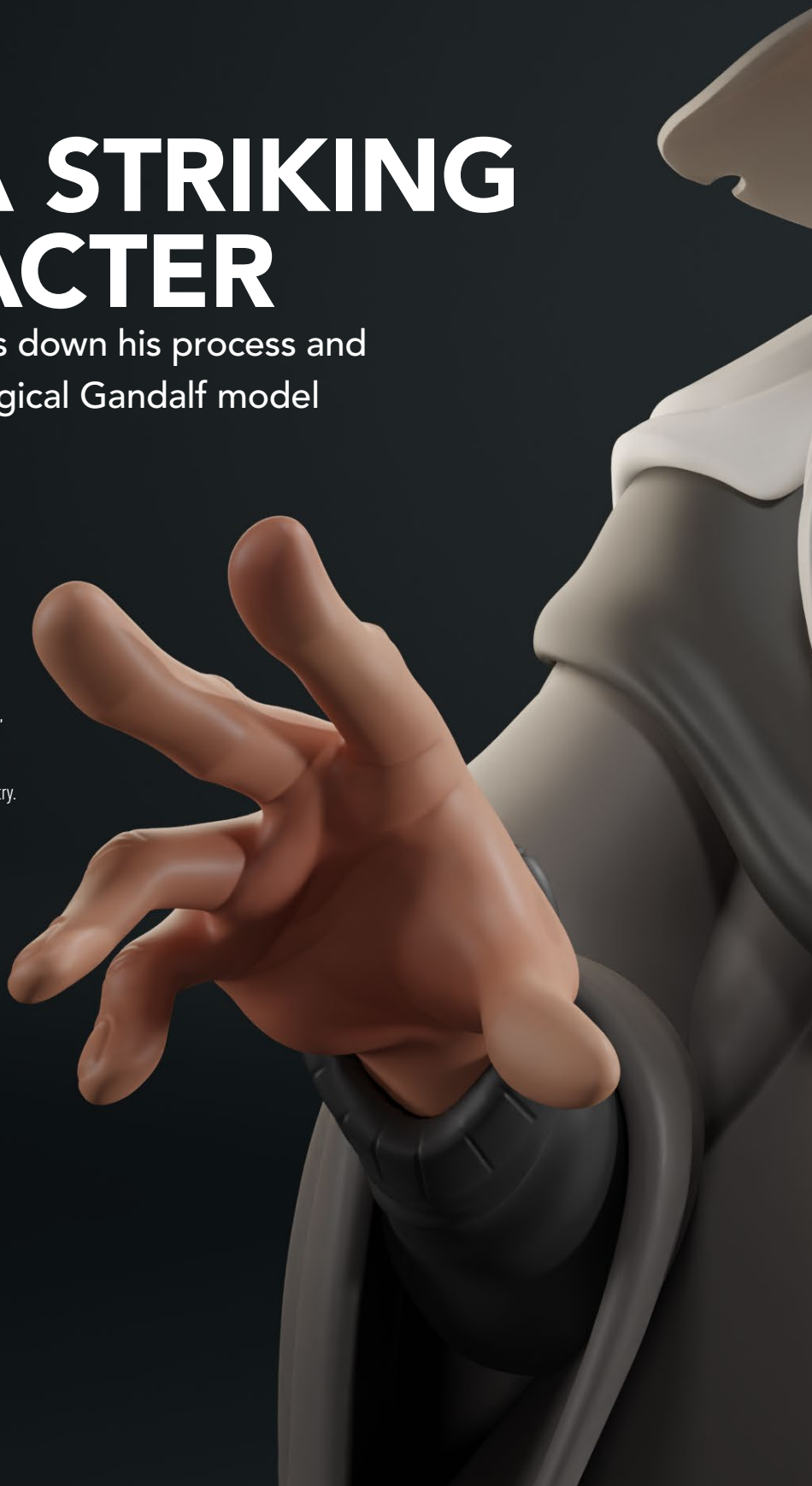
**Guilherme Luis
de Oliveira Silva**

Brazilian artist focused
on character modelling,
texturing and concept,
currently working as a
freelancer in the industry.
[www.artstation.com/
u928d2da0](http://www.artstation.com/u928d2da0)



DOWNLOAD YOUR RESOURCES

For all the assets you need go to
<https://bit.ly/3D-world-unreal5>





GANDALF THE GREY

This stylised version of the Fellowship's wizard is based on a concept by Javier Burgos (bit.ly/3KWEjeK)

01 INITIAL SCULPT

As a first step, I always try to build up the piece without thinking about details or resolution. It's as if I split it into layers: the base layer, a layer for secondary forms, and then two passes for refinement and finishing. Since this model is not going to be animated or used for production, I am only using symmetry for the face.

When assembling the body, I did not worry about realistic proportions, but made it as close to the reference as possible to achieve an exact fit. I consider blocking to be the most important step in the process. I always try to keep the mesh as low resolution as possible for as long as possible; for this I used only polyspheres and the Move brush, focusing only on what was necessary.

02 BUILD THE CLOTHES

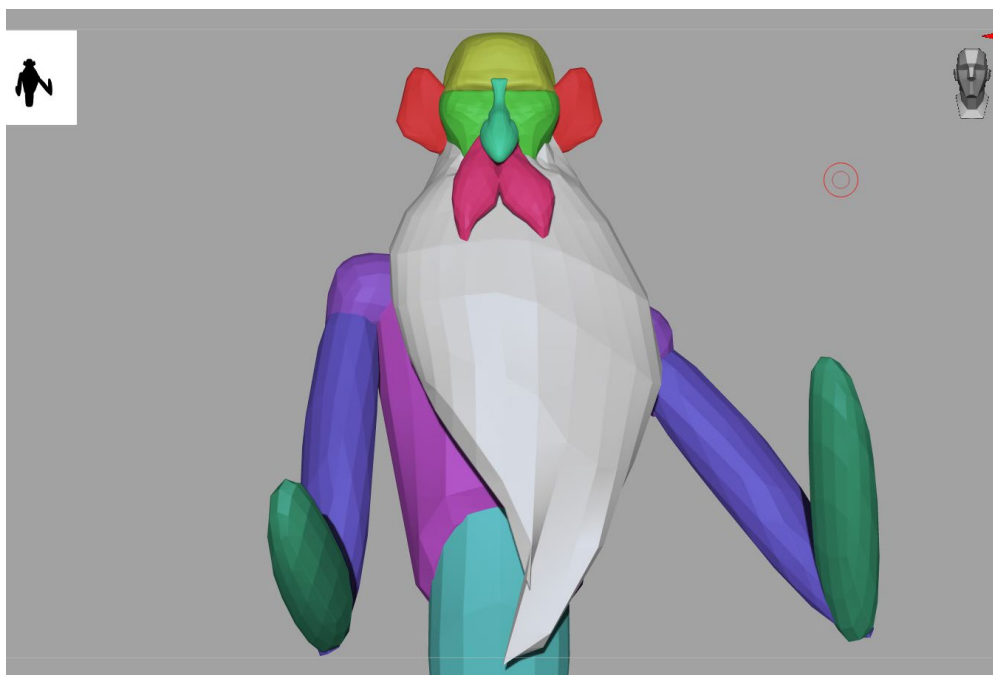
For clothing I follow the same reasoning as for the body. For the sleeves I used two different techniques. I used DynaMesh (Tool>Geometry>DynaMesh) with the help of the Move brush to create the sleeves. This tool will be used a few more times in this tutorial.

To create the holes in the mesh I used Select Lasso to hide the selected area and then Del Hidden (Geometry>Modify Topology>Del Hidden). After that I used GroupLoops (Tool>Geometry>EdgeLoop>GroupLoops). This is one of my favourite and most-used tools to make the ends of parts cleaner and improve the flow of polygons.

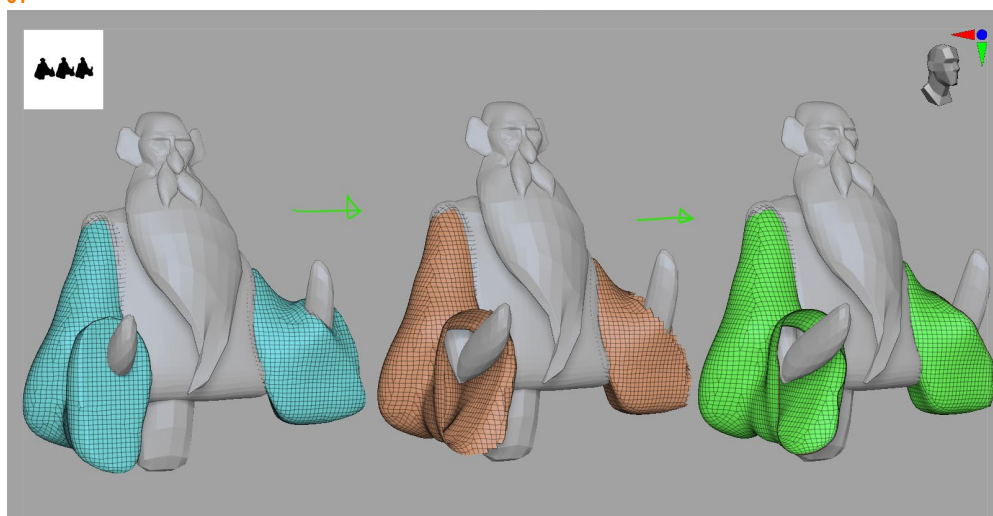
03 CLEAN WITH ZREMESH

If you use DynaMesh and keep changing the piece, the polygons tend to get cluttered and stretched. So I used ZRemesher (Tool>Geometry>ZRemesher) to create a cleaner mesh. I opted for a low resolution to make the figure easier to handle. In addition, ZRemesher was also used for most parts of the figure, such as the beard. Whenever the geometry of the object starts to stretch or deform, I use this handy tool to reorganise it.

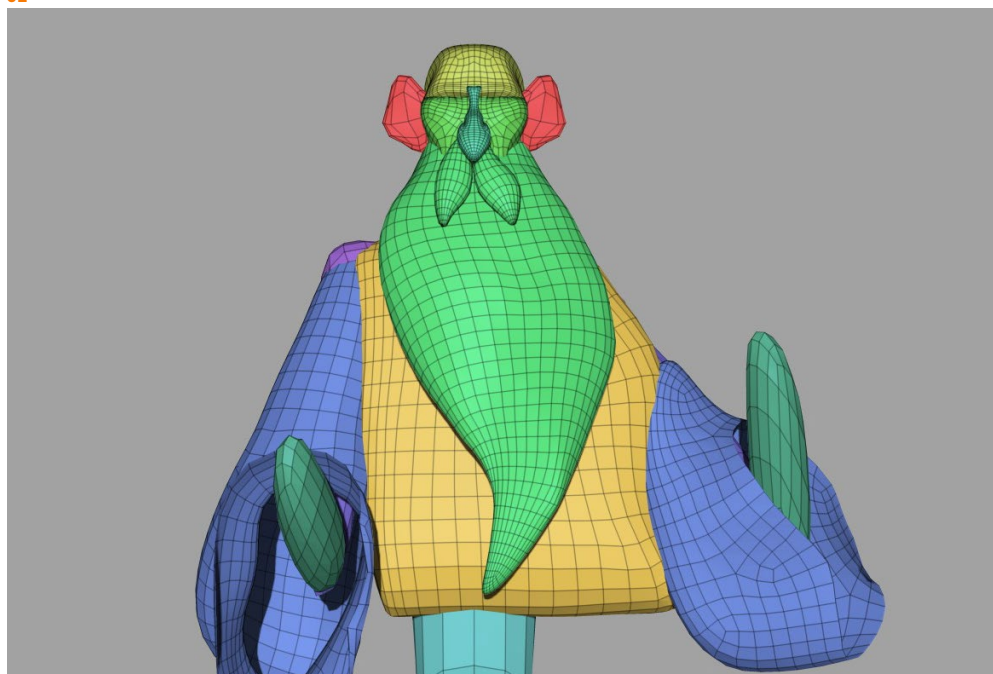
In these first steps it is very important to keep the model clean



01



02



03

and well organised, also separated into pieces and polygroups.

04 BLOCK THE HAT

For the hat, I used two cones as as primitive shapes and used the gizmo and Move brush to stretch the pieces. After achieving a satisfactory format, I used DynaMesh at a low

resolution to join the two pieces. Then I drilled a hole in the bottom of the hat and used SliceCurve to split it into different polygroups that I used to separate the bottom of the hat, the middle, and the top. I used GroupLoops to clean up the groups. When the object is split into different groups, we can

Don't be afraid of imperfections

Something to watch out for in modelling is the extent to which things are perfect and symmetrical. Breaking the symmetry of models is an extremely important step in making them look less artificial. Do not be afraid to break what you have just built. Vary the shapes and sizes and try to find a balance between a natural look and an artificial one. Try to take breaks during these tasks so you can look at your model with fresh eyes and identify any flaws.

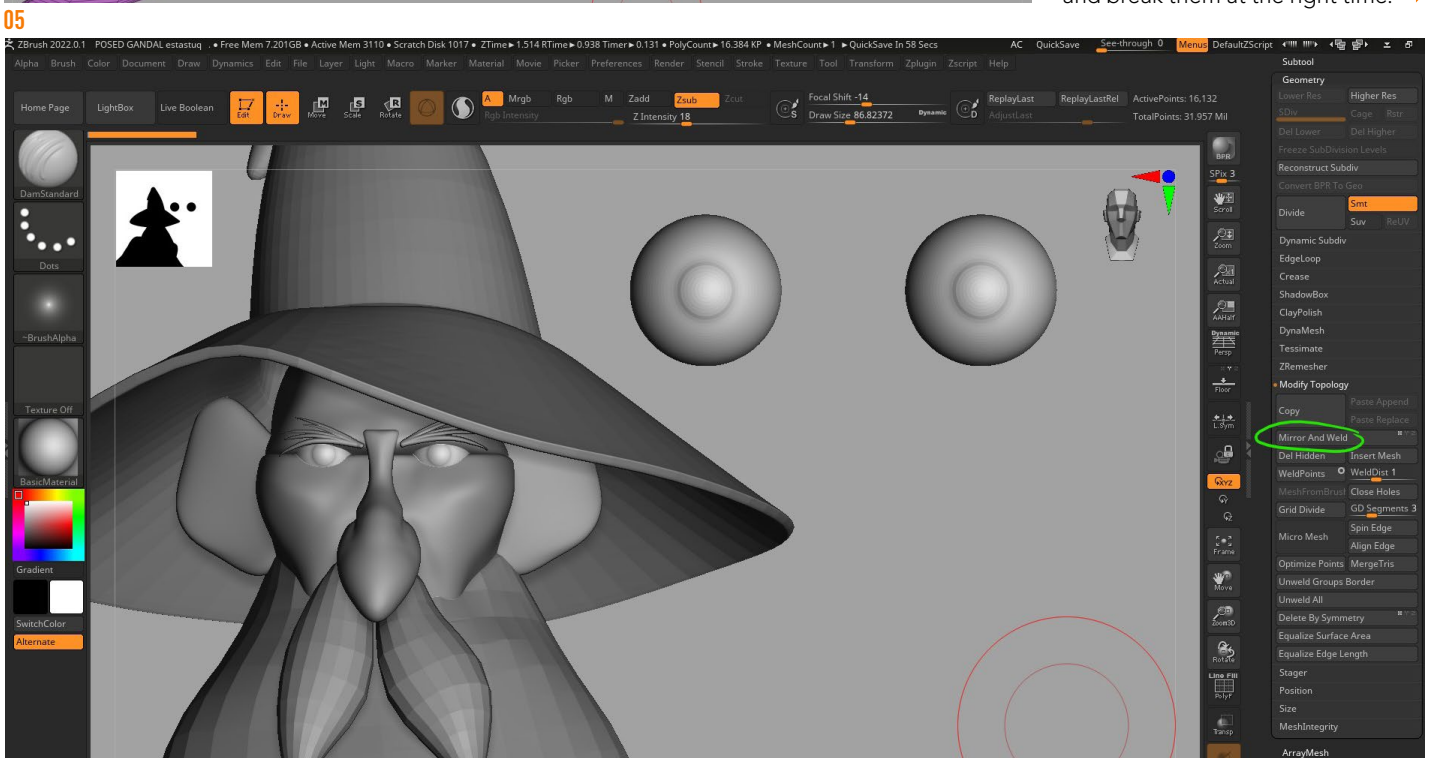
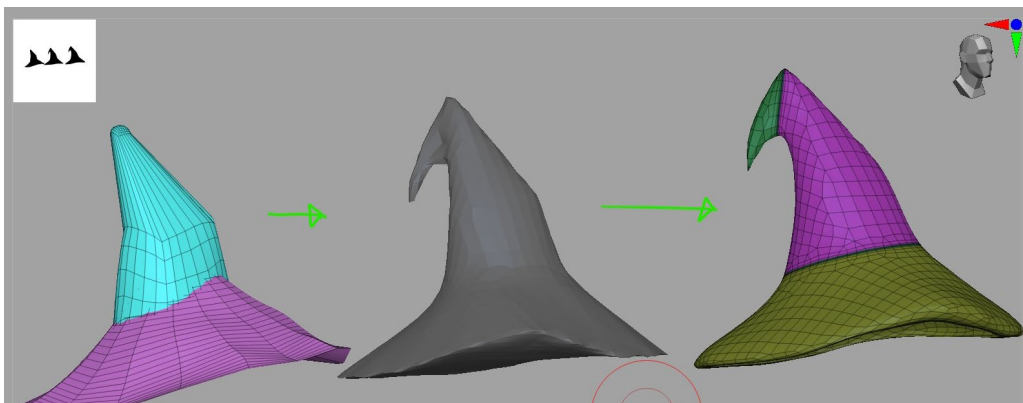
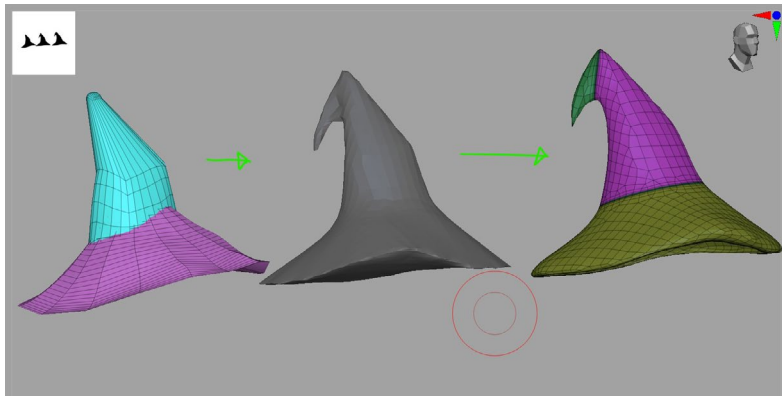
adjust them separately because the hat is a highlight that I wanted to work on slowly.

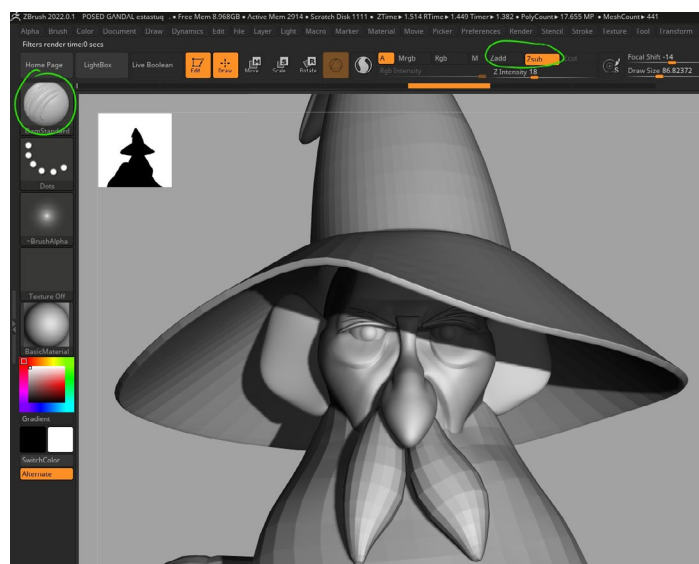
05 CLEAN IT UP

After completing the previous processes, it is necessary to clean the mesh of the hat. Using ZRemesher and the Keep Groups option, we can reorganise the polygons while keeping the polygroups. I prefer a very low resolution, and then use the ZModeler brush to remove most of the edge loops and keep only those that shape the object. After some more changes with the Move brush, I used Extrude All Polygons with ZModeler to add thickness to the object.

06 ADD THE EYES

This is a relatively simple step. I added a sphere to one side of the face and then used the Mirror and Weld tool (Geometry>Modify Topology>Mirror and Weld). The size of the eyes depends on what you are modelling, but I try to keep a realistic eye distance and place them in the centre of the face. Therefore, it can be helpful to split your model at the beginning to find its landmarks. When modelling stylised, it is important to understand how some anatomy rules work so you can deconstruct and break them at the right time. >

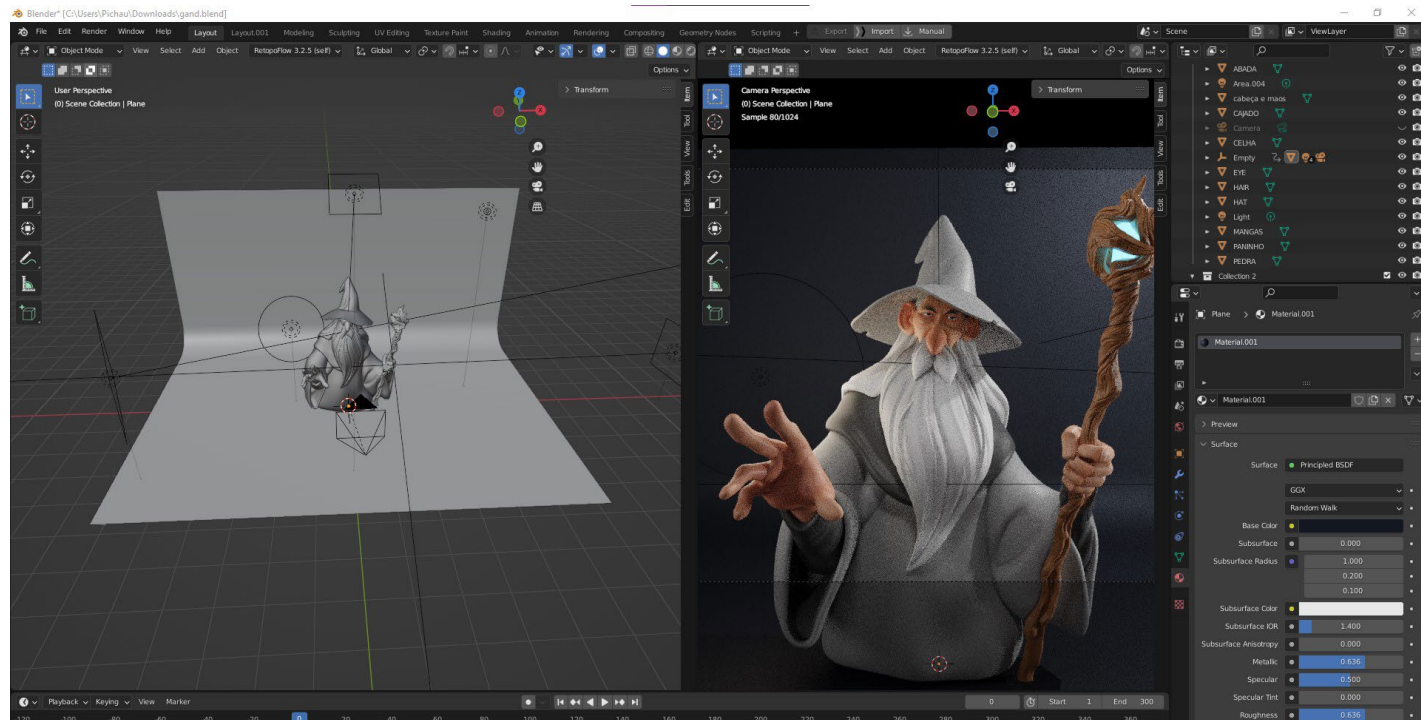




07



08



09

Look for the contrast

Try to combine shapes in different ways. Improve your observation skills by breaking down objects into primitive shapes, circles, squares, triangles, straight lines and curves. Try to find and build up points of contrast in your object, and try to find a reason for the repetition of shapes and include it in your work.

07 DETAIL THE FACE

For the face, I focus on the main features of the concept without going into too many details. To create hard edges, I used the Dam Standard brush and the Pinch, both of which you can find in the brush menu. Alternating between Zadd and Zsub with the Dam Standard is a good choice for stylised models.

For this model, my main goal was to show the shapes cleanly, so the Smooth brush and hPolish are great allies. Do not be afraid to go a little rougher at first, and do not stick to your shapes initially – you can always touch up later.

08 REFINEMENTS AND DETAILS

First I broke the symmetry with the Transpose Master (Zplugin>Transpose Master>TPoseMesh), then I started adding parts like the hands and secondary parts of the clothes, and with a cylinder and DynaMesh I built the staff. For this I used the same previous techniques and nothing more: Dam Standard to detail, ZModeler to add the thickness of the clothes and DynaMesh to assemble some parts together. For the beard I used the Brush Curve Tubes and then I sharpened their ends with the Smooth brush.

09 RENDER AND COLOUR

This step is simple, for the colours I just used ZBrush Polypaint – nothing too complex, I just coloured the eyes, skin and staff, the rest I just varied with grey, then exported to Blender.

I chose simple lighting and materials because that was my focus: to show the model and its shapes. I used three main light points and added a glowing material to the stone of the staff, I also placed a background of the object and an ambient light. Try to vary the tone of the lights if you want something more attractive, mix warm and cold tones. •



SUBSCRIBE TO THE 3D WORLD NEWSLETTER

Get practical inspiration direct to your inbox



FRESH
3D CONTENT
**EVERY
FRIDAY**

NEWS | TIPS | REVIEWS | DEALS

SUBSCRIBE NOW!

<http://bit.ly/3Dworld-newsletter>

TEMPLE OF ATHENA

A personal concept art
environment inspired
by Greek mythology



UNREAL ENGINE 5 | PHOTOSHOP | ZBRUSH OR RELEVANT MODELLING SOFTWARE | SUBSTANCE PAINTER

CREATE CONCEPT ART IN UNREAL ENGINE 5

Design and overpaint an environment with Ellie Cooper from
Athena Productions, using the power of Unreal Engine



I often receive questions from artists about what software they should be using to create concept art, and how they are conflicted on which software to sink their time into learning – I agree! You see one person on social media do an amazing painting in Blender, another in Photoshop with no 3D whatsoever. Concept artists are not lacking for choice on software and are often lost on what to use for their work – and

in my experience there is no one correct answer!

I have used my fair share of programs, such as Octane, Blender and even SketchUp, but Unreal Engine offers unique advantages: real-time rendering, Nanite, Megascans, Lumen, MetaHumans and so much more that can be hugely beneficial to concept artists.

I work at a studio called Athena Productions, which is a concept art and matte painting

studio consisting of artists specialised in Unreal Engine 5. I will be giving an insight into the studio's pipeline and how you can create a peaceful temple environment using Unreal Engine 5 and Photoshop.



DOWNLOAD YOUR RESOURCES

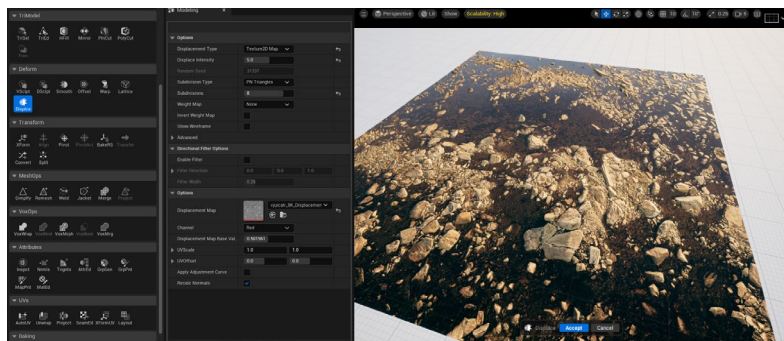
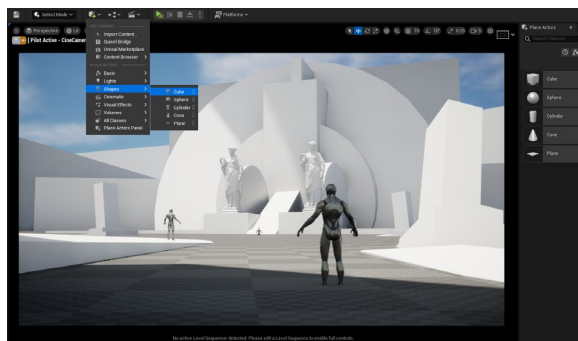
For all the assets you need go to
<https://bit.ly/3D-world-unreal5>



AUTHOR

Ellie Cooper

Ellie is an art director at Athena Productions, a studio of concept artists and matte painters specialised in Unreal Engine. athena-productions.com



01 INITIAL BLOCKOUT

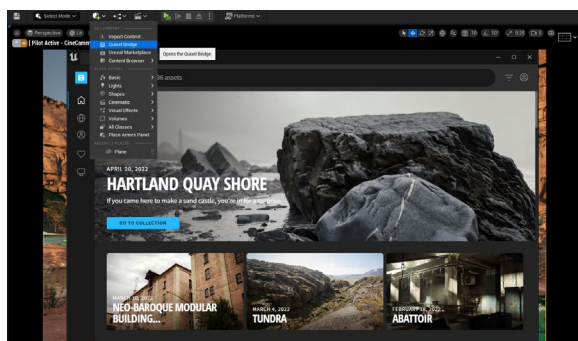
Start with a blockout and establish your camera for the main focal point and surrounding structures. You can use Cubes from either the Place Actors menu which you can toggle from Window, or the quick-add dropdown on the top left above the viewport. You can also add a mannequin to help guide your piece with scale and distance, found in Content>Mannequin>Meshes.

02 USE MODELING MODE

To create the displacement of the riverbed, you will need to use the Modeling Mode. You can enable this in Plugins underneath Edit. For this project, we have used Megascans for the base material and used the Displacement map that comes with it. First, create a plane and in Modeling Tools go to 'Displace'. You can edit the Intensity, Subdivisions and add the Displacement Map. After this you can 'Simplify' your mesh, and you can also enable Nanite to optimise your scene.

03 ADD WATER

To add water to your scene, create a plane and add a default engine material to it called 'MI_Pool_Water'. You can change some of the parameters in the Material Instance such as Colour, Depth and more. To add accurate reflections, you can add a 'Planar Reflection' which is found in the Place Actors category – you will need to enable it in Project Settings, close the project and reopen it. Now just align the Planar Reflection with your water and decide where it looks best. If the water seems a bit glassy hit CTRL+G on your keyboard.

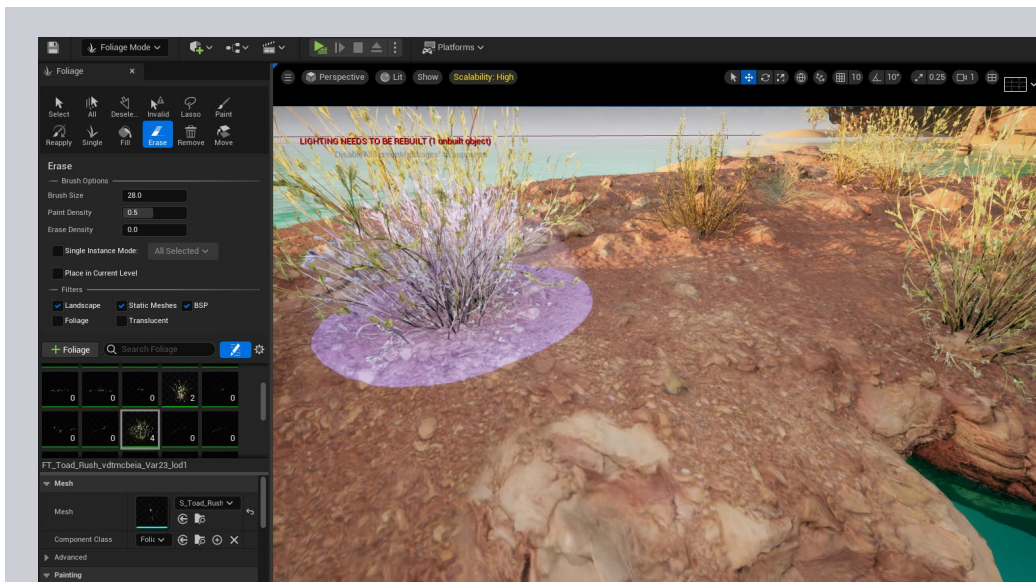


04 MEGASCANS ASSETS

Megascans is a powerful tool when creating any scene in Unreal Engine, whether it is 3D assets, materials, or decals. You can open the Quixel Bridge from inside Unreal Engine and once you have an asset in mind, you can choose what level of quality the asset is imported into Unreal Engine at, from lowest quality all the way up to Nanite on certain assets.

05 LET'S TALK NANITE!

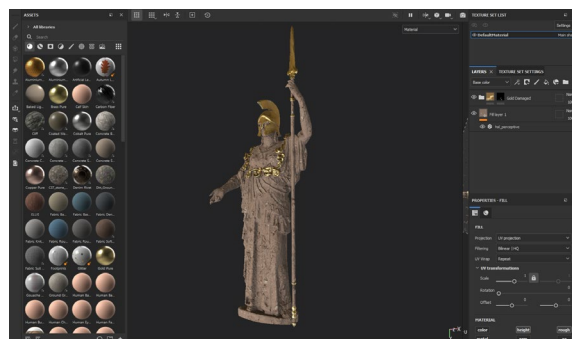
Concept artists rarely have time to optimise their custom 3D assets, which is why Nanite is a game changer! Nanite is a defining tool for Unreal Engine and lets you import movie-quality assets. For concept artists this means you can import your high-resolution models into Unreal Engine, enable Nanite and keep building without lag or destruction to your models. You can enable Nanite when you first import the model into your scene, or you can do it by opening the Static Mesh Editor for that model and enabling it there.



06 PAINT FOLIAGE The Foliage Mode is one of the most powerful tools in Unreal Engine. Not only can you use it to paint foliage but also a crowd of characters, creatures etc quickly. Be careful that these are optimised as you can quickly make your project lag! To add your own foliage, just drag and drop your mesh into the box on the left-hand side, and to select a particular mesh hover over the icon and in the top left tick the box. To mass select numerous meshes, hold down SHIFT+click.

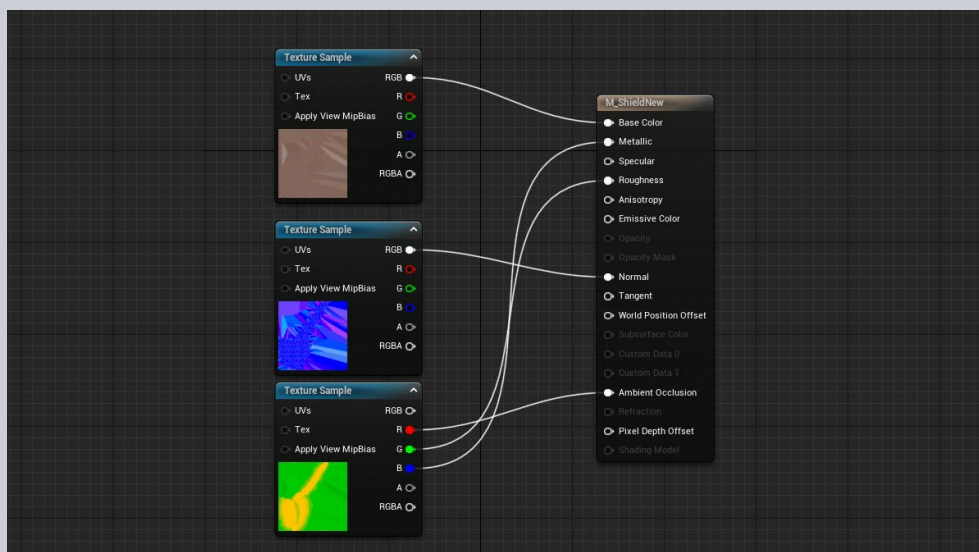


07 ADD CUSTOM ASSETS You can model your custom assets in whatever modelling tool you prefer, but for this tutorial ZBrush was used to create the temple models. At this stage we want to check how the models will look in the composition, and whether we want to do any further modelling. This can be a constant back and forth, so never feel like you need to nail the final look immediately!



08 USE SUBSTANCE PAINTER FOR MATERIALS Substance Painter cleverly lets you unwrap your model and texture it all within the software. You can then export the model with its newly made UVs and textures and import into Unreal Engine. As you are going back and forth between the two programs, you can easily update the materials in UE rather than importing additional textures or make new materials each time.

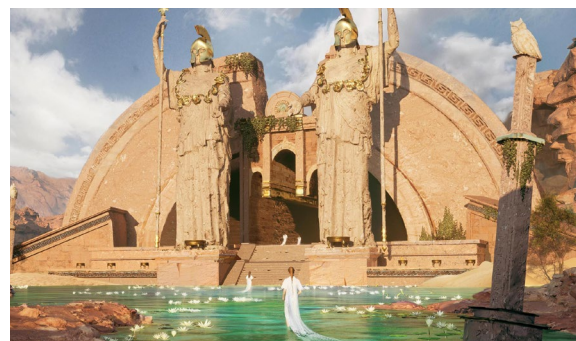
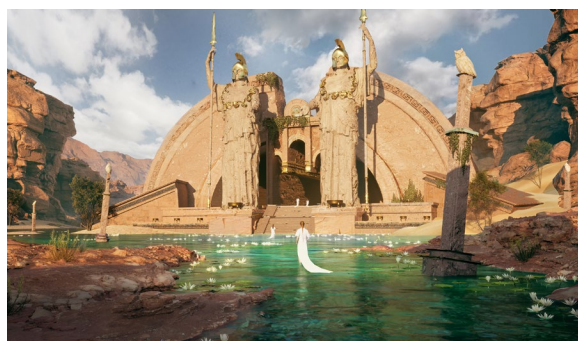
Keep a photo library!
Always be collecting images you find on the internet for inspiration, photo bashing usage (check your licences!) and for reference. You can either save these onto your PC or use websites such as Pinterest to store and collate them.



09 SET UP MATERIALS AND TEXTURES To set up the textures from Substance Painter into a material, start by creating a new material by right-clicking on your Content Browser and clicking Material. Once you open the new material, you can drag and drop your textures from your Content Browser into the window. The Diffuse Map goes into 'Base Color' and your Normal Map into 'Normal'. As for the OcclusionRoughnessMetallic Map, Red into 'Ambient Occlusion', Green to 'Roughness' and Blue into 'Metallic'.

Have a 'Master' Unreal Engine file

When you create unique materials, assets or anything you may want to use in future that isn't in your Epic Library, add it to a separate Unreal Engine project which will become your 'Library' that you can quickly migrate assets from into your current project. It will save you a lot of time!



10 ALWAYS BE FLEXIBLE

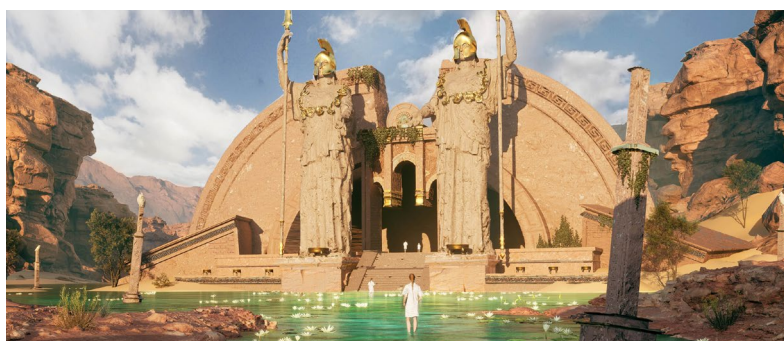
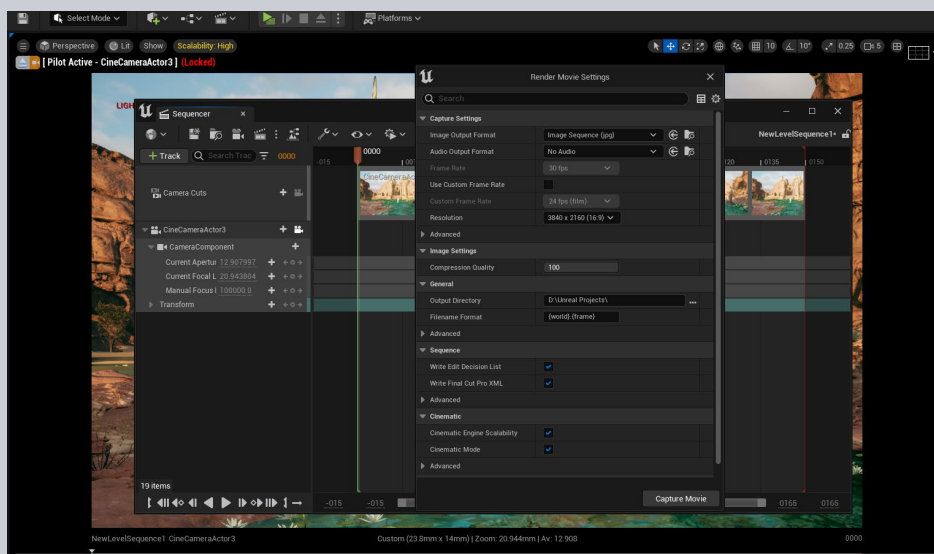
As you create your piece, you will be constantly tweaking parts of the composition for better read and flow, so don't be too attached to the original blockout. The composition is opened a bit more, so that the landscape feels like it has some depth; you want viewers to feel like they could walk around the side of the temple and that there may be something behind it.

11 FINAL TWEAKS

The materials made earlier from Substance Painter are added to the architecture. In the final steps, you can now tweak or add elements that will help the overall image. From Megascans and Epic Marketplace you can add additional foliage to the temple, surrounding landscape and the water, such as using lily pads to create a path that acts as a guide to the base of steps.

12 RENDER YOUR ENVIRONMENT

To render the environment, Level Sequencer is the most accurate. It captures colour, details and is more stable than using High Resolution Screenshots. Create a new Level Sequence then add the camera you have been using into the newly opened window. You will then see the Playback and other details which you can change as you wish – it is worth exploring! In the Image Output Format window, you can drop down the Image Sequence option and choose a file format e.g. JPEG, EXR, PNG. It may take a minute to render, but it beats hours of rendering in other programs!

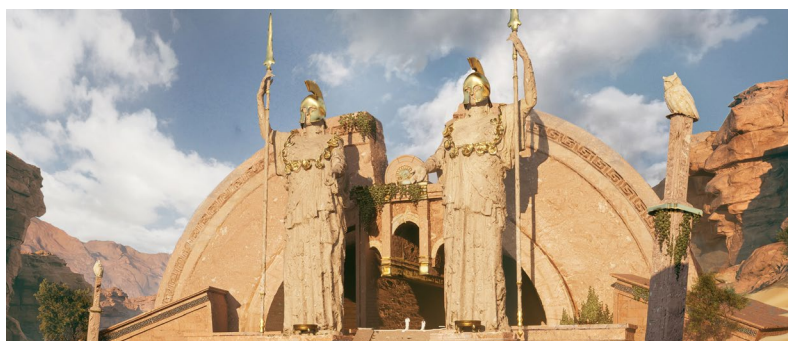


13 YOUR EYES ONLY!

When you first begin to overpaint, it is a good idea to write and draw over your rendered piece on a new layer, using a stand-out colour to show what you would like to change. No-one but you will see it, so if it makes sense to you that is all that matters. It lets you take a step back, set goals and look at the image objectively – you may find yourself coming up with an idea out of the blue!

14 BEGIN TO OVERPAINT IN PHOTOSHOP

First, start to establish the depth in your image using Curves. The sky is replaced quickly as it is essential for nailing down the composition and mood of the piece – you can find good sky photos on sites such as Flickr, MattePaint, etc. The water is an important part of the composition and should also be tackled quickly; by using Curves and Color Balance you can begin to play with the contrast and colour. Don't feel like you need to nail these things immediately – making concept art is a constant process.



15 WORK ON THE ARCHITECTURE

Throughout the creation of this image, whenever any issues arise, the focus is turned to those areas. Here the architecture is being tweaked with lighter tones on the top and bottom rings, using curves and a few grunge textures to add a bit of difference in the textures. The surrounding landscape such as the sand is also worked on, using more textures from photos – I try to find photos that have a good resolution already, though you can always sharpen up images if needed.

16 USE THE MIXER BRUSH

For the character, you can add another layer of interaction with the environment such as the fabric being dragged through the water. You can find photos to use on various stock websites. Using the Mixer Brush, which you can find in the toolbar on the left of your screen, you can begin to blur a few sharper areas of the image, and make some parts of the 3D look more 'painterly'.



17 ADD WEATHERING

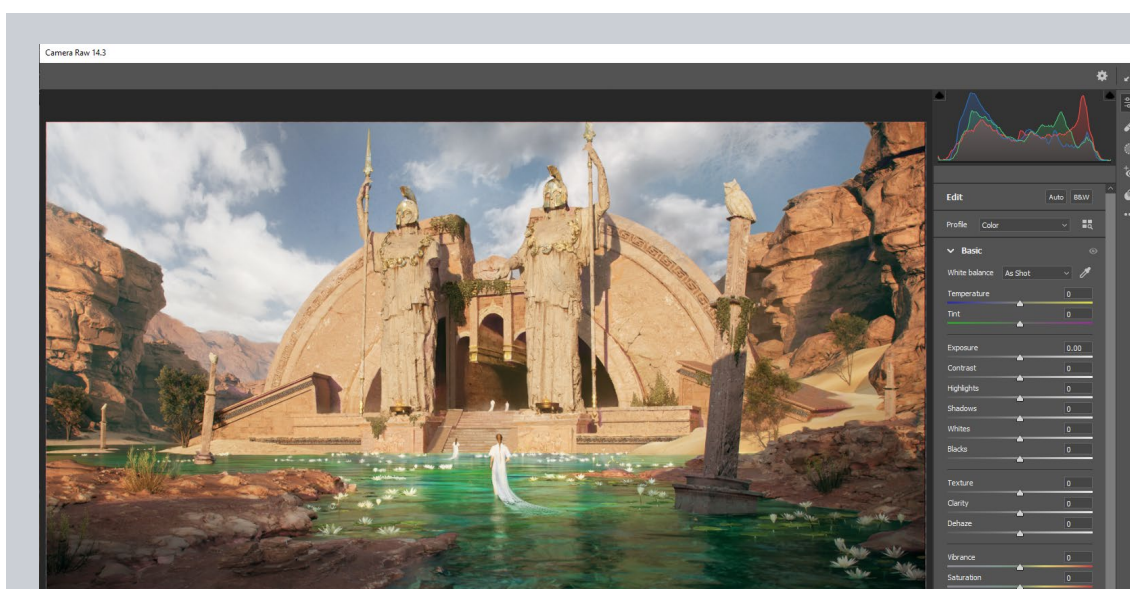
Two statues rarely look the same, and will have imperfections from being weathered over time. Using photo textures of weathering, peeling gold foil, rust drips and others on various layer modes, you can quickly build up a more ancient-looking statue. You can also play with damage using elements such as a missing arm or cracks on the statues.

18 FINISHING TOUCHES

The final 10% can feel like the hardest part, but adding in the final touches to really close out the image is important. Add some more details, like damaged pillars. Using a soft brush, with low opacity and your layer mode on lighten, you can also add some vibrations of colour in your shadows or on the edge of a shadow. This gives your shadows a hint of colour and pop!

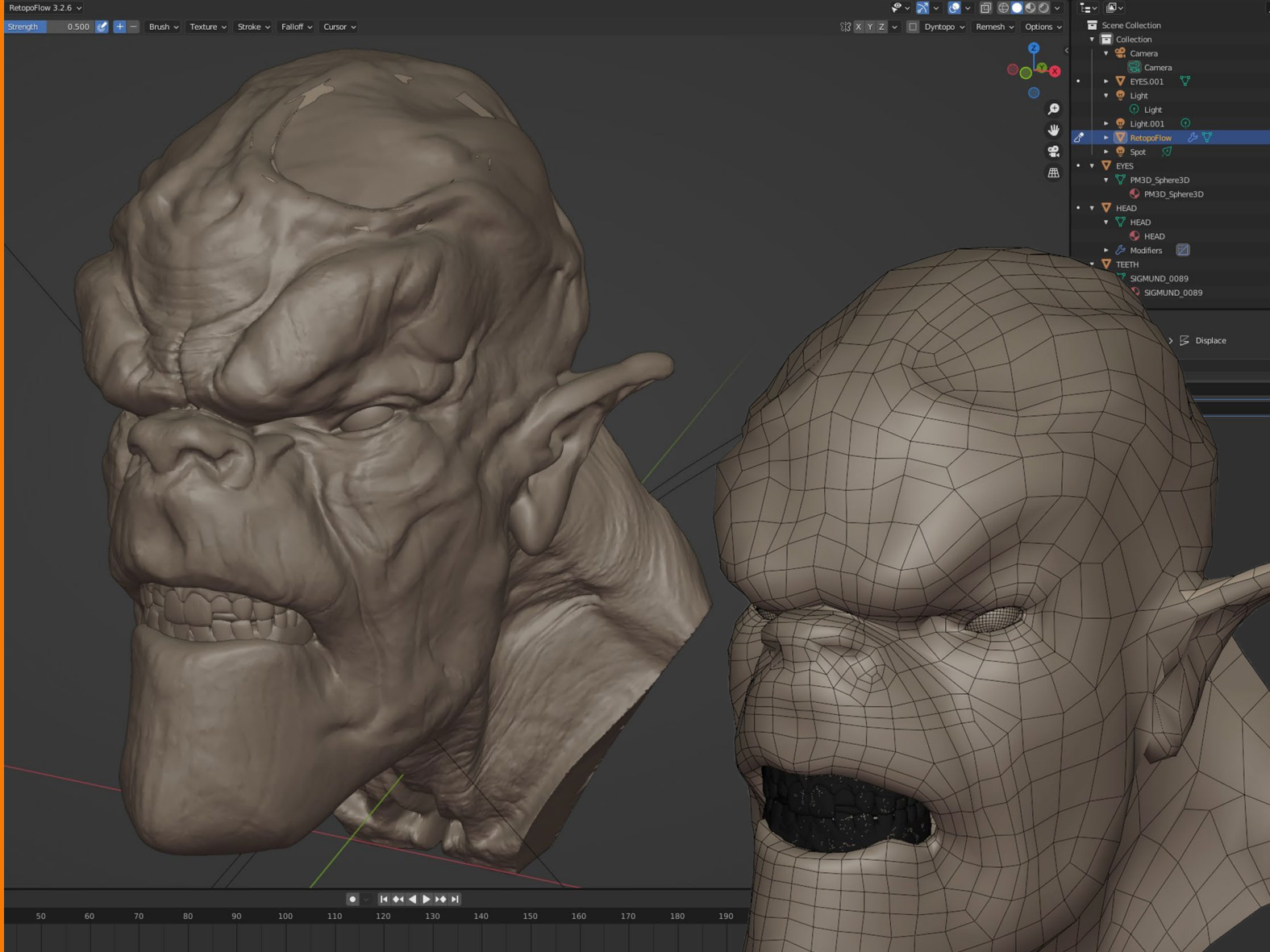
Stay flexible!

Don't get too attached to a piece, be ready to pivot if your client requests it and don't take it personally. Your client – just like you – only wants the best for the final piece. Nothing turns clients off quicker than someone who huffs and puffs at the slightest request for a change – so don't be that artist!



19 CAMERA RAW FILTER

At the end of every image you can use the Camera Raw Filter, which you can find under 'Filter' or SHIFT+CTRL+A. From here you can do the final tweaks to your image, such as changing the Exposure, Temperature, adding noise, sharpening and more. It's a useful and quick tool to finish off your image. ●



BLENDER | RETOPOFLOW BY CG COOKIE

RETOPOLOGISE IN BLENDER

Blender is an amazing sculpting package, but what about when you want to go a little further and create good topology?

There is nothing on the market like Blender; it is both amazing and still 100% free after all this time, and getting more and more feature rich as the years roll by. There are so many reasons to use Blender these days, including to sculpt amazing characters and creatures as you would in ZBrush or 3D-Coat. But what about when you want to take the sculpt to the next stage and think about rigging and animation? Well, Blender excels in these as well.

In this quick tutorial, I want to introduce readers to retopology in Blender – and although you can do it right out of the box, there are actually fully featured add-ons that make the process even easier. In this case we will use RetopoFlow from CG Cookie. It's a paid add-on, but is available on GitHub if you wish to download and try it, or if you are a developer wanting to use it in your next project.

We won't be covering the sculpting part in this tutorial,

but rather we will cover the sort of tools you might use to retopologise a sculpt of this type. This tutorial assumes you have a basic understanding of the Blender interface and how to open models and navigate around a little.



DOWNLOAD YOUR RESOURCES

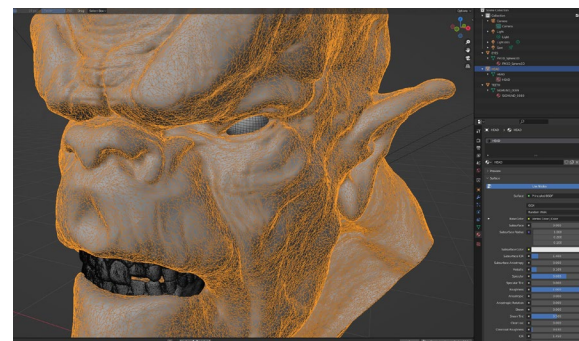
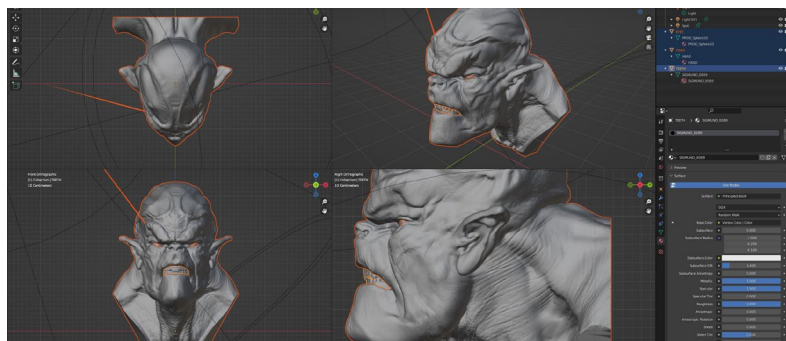
For all the assets you need go to
<https://bit.ly/3D-world-unreal5>



AUTHOR

Glen Southern

Glen runs SouthernGFX, a small Cheshire-based studio specialising in character and creature design. He has been using and training ZBrush in the UK for over 20 years.
www.southerngfx.com
creativecourses.com

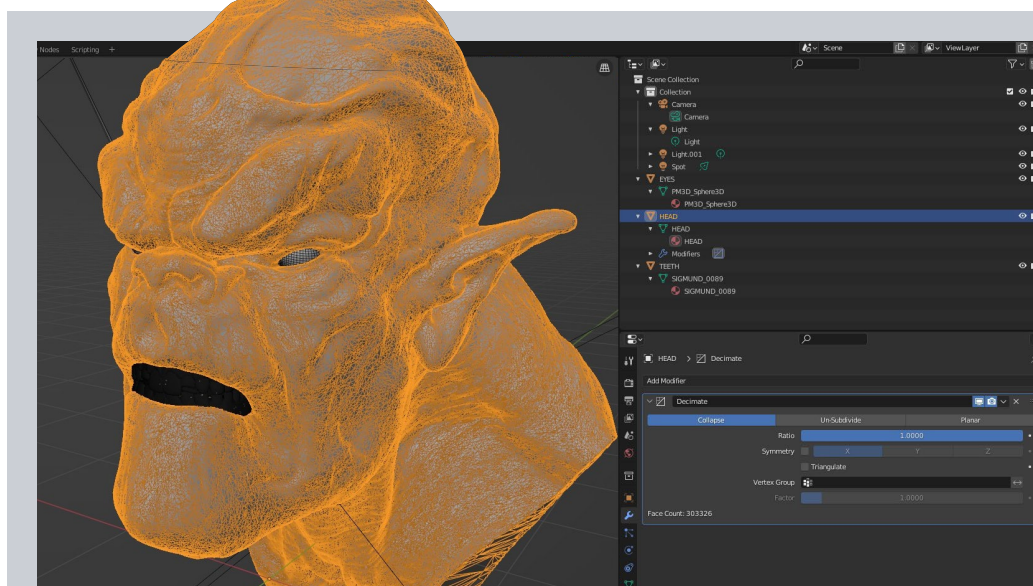


01 SCULPTING TO RETOPOLOGY

Blender has modes for everything you want to do. For sculpting you would be in the Sculpting mode accessed from the main interface at the top. You would do most of the work in this mode and maybe switch to the Modeling panel or even the Layout panel as you come to the end of the sculpt session. For retopology, it doesn't really matter which mode you are in as you will see, as RetopoFlow takes you into its own workspace and hides parts of the main Blender interface, giving you a new panel of tools to work from.

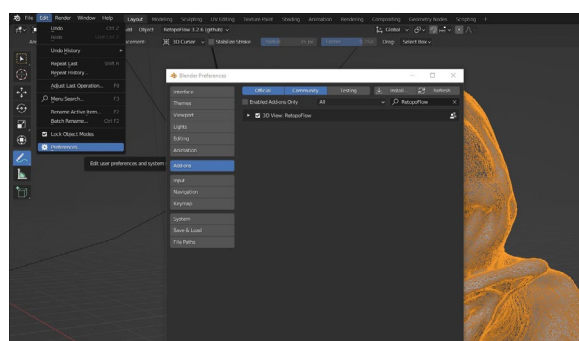
02 DECIMATION

Your sculpted model almost certainly has a very high polygon count. If you try and retopologise that it may struggle and start to lag or crash. Find the Modifiers panel (bottom right) and add a Decimation Modifier from the list. From there you can lower the polygon count to something reasonable like 250K polygons. In this tutorial we are only focusing on the head part of my sculpt.



03 TRIANGLES DON'T MATTER HERE

Decimation is about how the overall sculpt looks rather than what the polygons look like under the surface. It is designed to give you a very accurate copy of the sculpt you have created, but without the complexity of a high-density surface that would be a massive issue. It is generally made up of triangles and it can look quite horrible if you turn on the wireframe view. Roll around the model and make sure it has kept the details that you want to use at a later stage.



04 PURCHASE RETOPOFLOW

RetopoFlow is made by CG Cookie and you can buy it from the Blender Marketplace. There is a version on GitHub, but this is recommended for developers only.

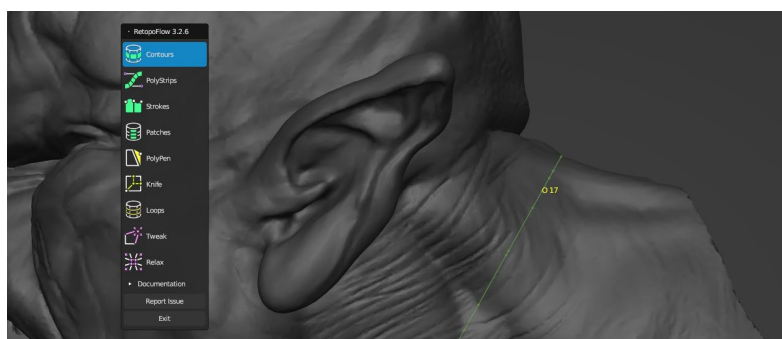
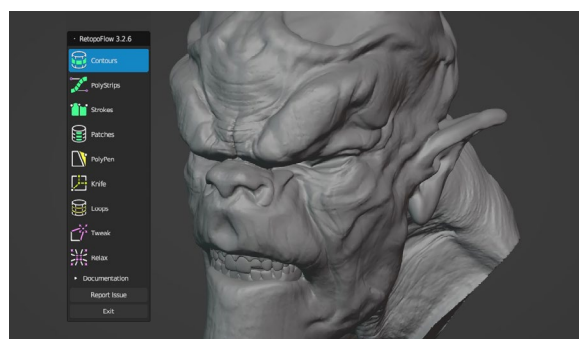
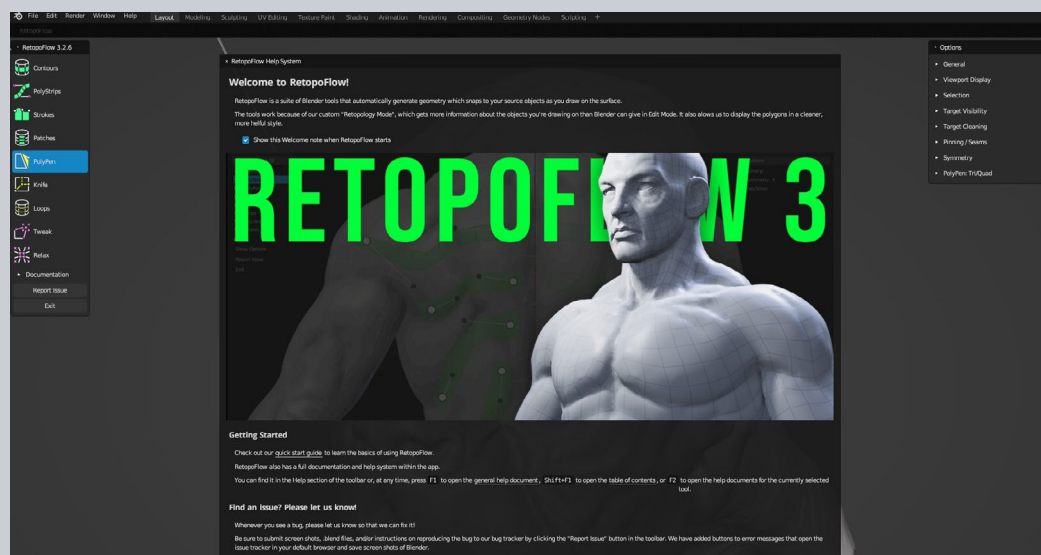
Download the ZIP and drop that somewhere on your machine. Go to Edit>Preferences>Add-ons, search for the ZIP then install it. RetopoFlow appears at the top of your Blender interface.

05 SELECT THE SCULPT AND LAUNCH ADD-ON

Make sure that you have your sculpt selected, then open the RetopoFlow menu and choose Create New Target – and use 'At Active'. This will make you a RetopoFlow object and you can begin to explore the add-on. If you look in the list of objects you will see it has created a new object and named it for you. Once you finish this retopo session, that will become your new mesh and it is in the correct place to match the original sculpt, hence why we added it using 'At Active'.

06 HELP IS AT HAND

When working with RetopoFlow, pressing F1 will give you some information and you can go online and read a very comprehensive manual that covers the entire feature set. There is a splash screen that gives you all the main links to documentation, and I would definitely recommend taking a few minutes to familiarise yourself with what the add-on is capable of. You can always refer back to the manual, but there are also tool tips and helpers in the add-on itself.

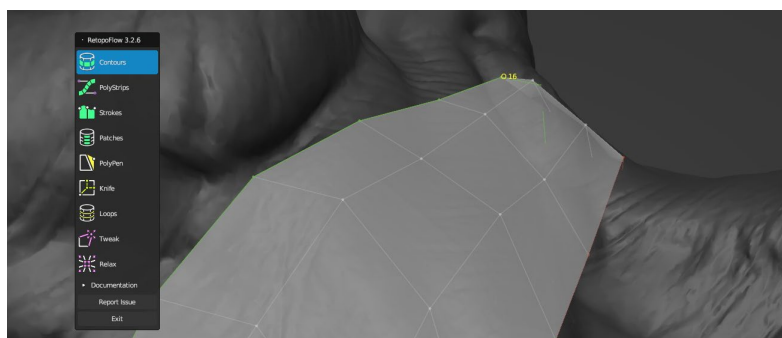
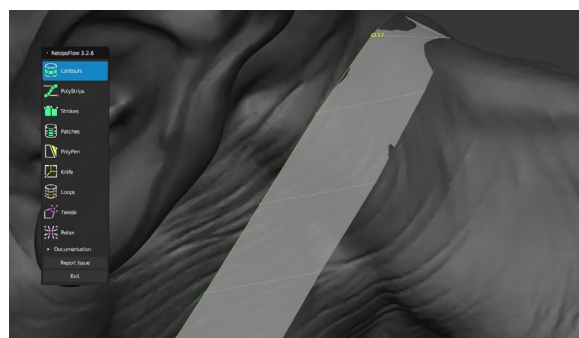


07 THE PANEL

So now it's time to start looking at the RetopoFlow interface, and the main part is the toolbar that contains all the key tools we are going to cover next. I don't advise using all of these on every project, but it is good to know what they all do so you can choose which to use and when they are most suitable. You will quickly find your favourite tools and use them more than any others.

08 CONTOURS TOOL

Contours are powerful but aren't going to be a lot of use for a head; they are much more useful for things like arms, legs, fingers – anything long and like a pipe. With RetopoFlow the tools are usually activated by holding CTRL. To use Contour, just hold CTRL and drag a line across the neck. You can use SHIFT to add points or use + and -. This can be a great way to lay down some geometry in the ways I just described, but we can only really use this here on the neck.

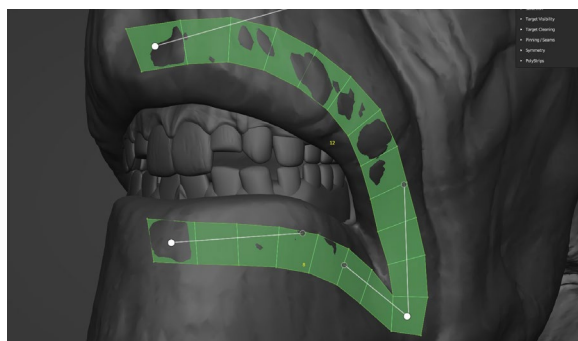


09 CONTOURS AROUND THE NECK

If you keep holding CTRL and dragging lines parallel to the first one, you will keep adding geometry. At this point we aren't using symmetry, so this again is where it is more useful for tube-shaped parts of a model. It is limited in some circumstances, but as with the other RetopoFlow tools it's good to be aware of what it can do for when the need arises.

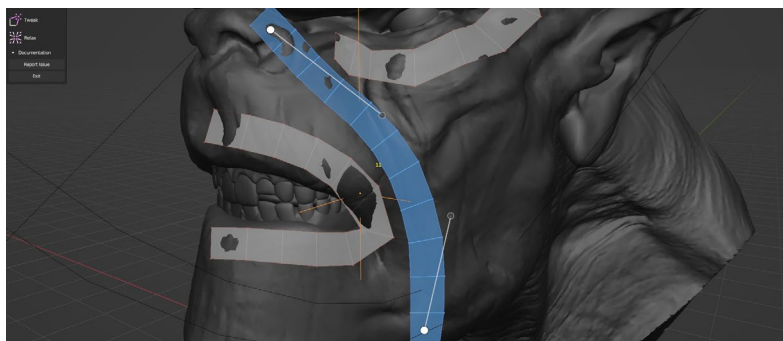
10 ADJUST AS DESIRED

The geometry may not have laid down in the correct position, so you can switch to the Tweak option that you will find further down in the menu. If you use F you can adjust the size of the area of effect, and then you can pull and push the points around to get the flow right for the model. Try to keep all the lines parallel, and you should always aim to keep the polygons looking like regular squares. You'll find that Tweak will be used a lot in most of the upcoming sections.



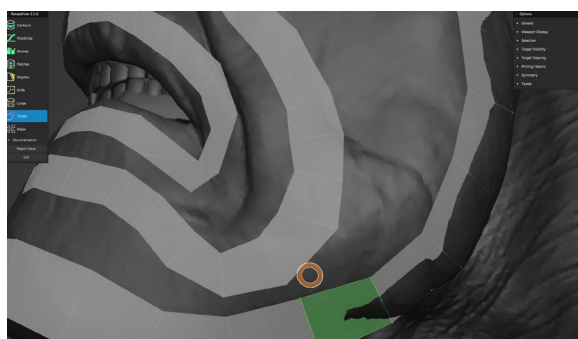
11 POLYSTRIPS

The PolyStrips tool is activated in the same way, by holding down CTRL and then drawing around the mesh in a predictable way. PolyStrips will literally let you draw strips of polygons so you can effectively lay down your entire model in loops before stringing those together. They have control handles that help you manipulate what you have laid down.



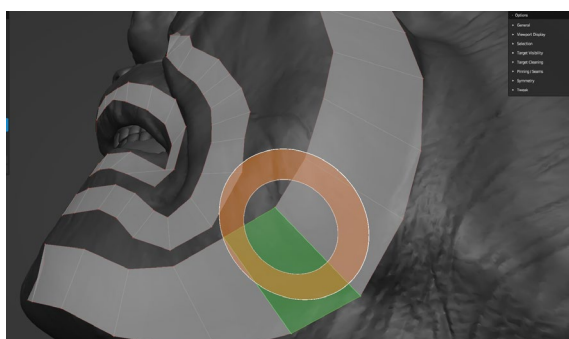
12 DEFINE YOUR LOOPS

The PolyStrip has a handle at the end and start to help you control the loop you have laid down. Use + and - to add or remove spans. You can control position and orientation by grabbing the point at the outer end of the control line and moving it around. If you re-draw more PolyStrips you can cross other loops and it will weld them together. This is a fantastic way to lay down your initial loops with the idea of stringing them together later. Always follow the contour lines of the sculpt and look for natural loops like the mouth area.



13 TWEAK IF NEEDED

Laying down the initial loops can be tricky at first, but don't worry if they aren't quite right as you lay them down. Switch to the Tweak mode again and use F to change the size to suit. Move individual points of entire sections to fit around the sculpt. Try and keep it low res for as long as you can and only add more loops and splits once you are happy with the overall layout.

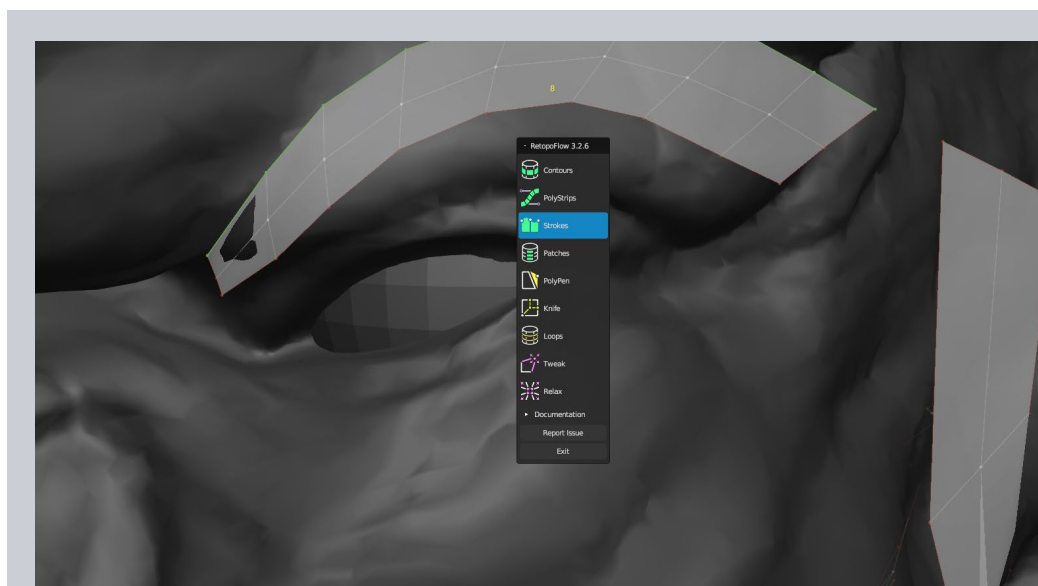


Display settings

There are loads of settings to help with visibility, including dark, light and no colour on the main model. You can also change the colour of your polygons to suit what works best for you.

14 F KEY DEFINES BRUSH SIZE

Pressing F brings up a ring that you then adjust for the task at hand. Change it regularly as you move around the model. If you need more influence then hold CTRL+F, and that allows you to change how much it will affect the thing you are tweaking or moving. You will be adjusting this a lot as the process moves forward for both Relax and Tweak.

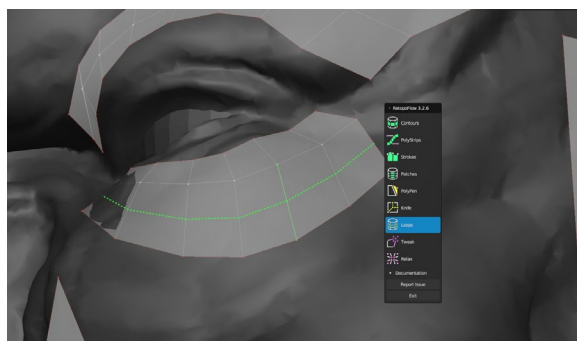


15 ADD STROKES

Strokes are yet another way to lay down geometry. Draw a line along a surface and then draw a second one some way away. This will create a section of geometry in between the two lines. Use + and - to increase or decrease spans. In most modes you can click on an edge to highlight it then move it around to get it into the correct position. As you are seeing, there are many ways to do the same job and the trick is getting familiar with them all and understanding which one should be used when.

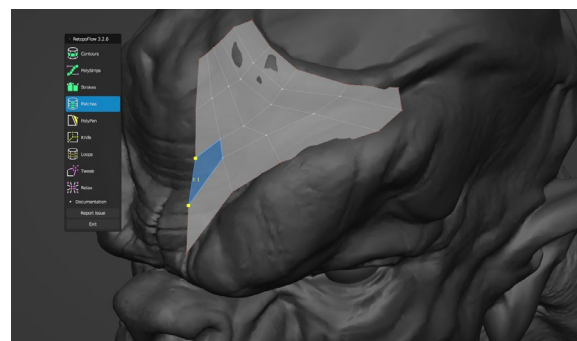
Tilde is your friend

Tilde gives you access to a radial menu that really speeds you up. When you start switching between tools every few seconds, this is the best way – until you learn all the keyboard shortcuts that is!



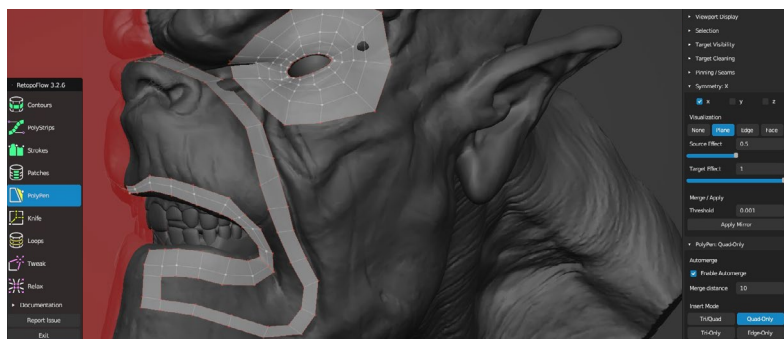
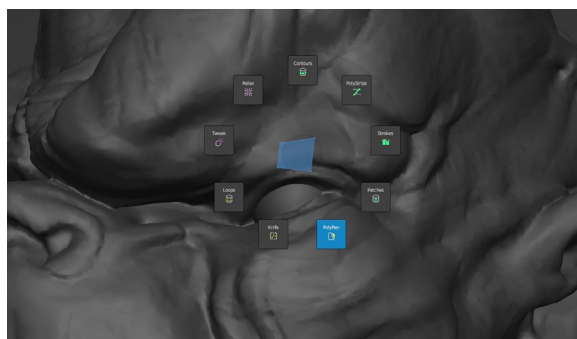
16 ADD LOOPS

If you have laid down a section of geometry that you like, use CTRL+A to deselect it. Go to Loops and select an edge at 90 degrees to the direction you want to run a new loop. A green dotted line appears where you want your new loops to be added. This gets very useful later on for areas like the eye. It is always best to lay down a low-poly section then add more loops later.



17 PATCHES

Moving on to Patches now. With this tool you can create a patch of geometry in a similar way to Strokes, but you can also pick an edge in a corner then double-click an edge that is adjacent to it and it will fill along the entire length of the row. This gets to be useful when you have laid down all your initial loops and you want to start blocking in large areas of the mesh.

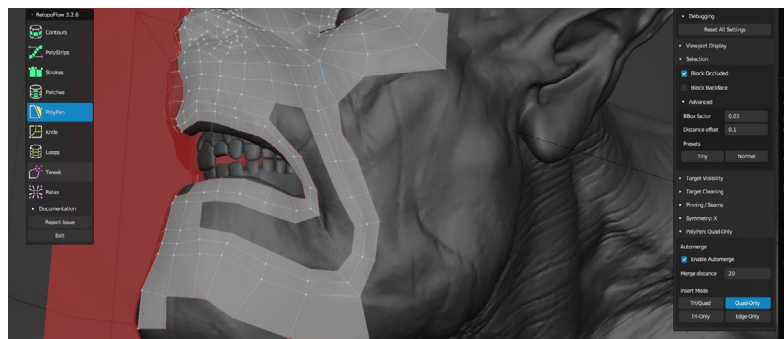
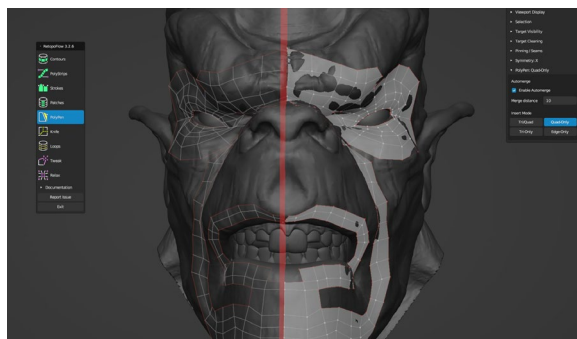


18 TILDE KEY

If you press the Tilde key you get access to a radial menu which pretty much mirrors the main panel. Accessing all the tools from there is faster and easier, as they appear under your mouse cursor so there is no need to head over to the sidebar every time to access a new tool. You will be switching a great deal so every second and every click really does count.

19 POLYPEN AND SYMMETRY

And so we finally come to my favourite tool, the mighty PolyPen. This is the workhorse of RetopoFlow for me. Before we dive in, let's just talk about symmetry. Now that we have explored the tools it is time to do a full retopo and we need to turn symmetry on across the X axis. There is a panel on the right of the screen that has a Symmetry section, and you simply click X in there. This gives you the Red Plane (this can be changed) across the centre line and anything on the right is mirrored across.

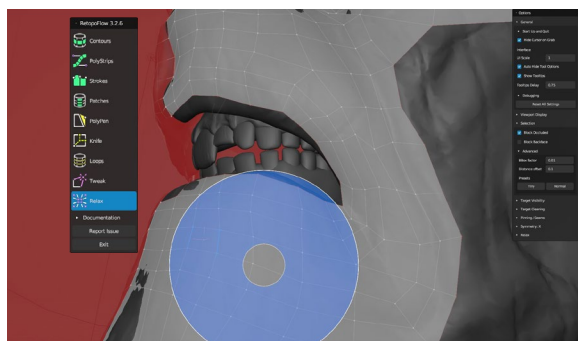


20 LOOPS WITH POLYPEN

With PolyPen you can draw the polygon you want by clicking on the surface. In the settings tab I recommend turning on 'Quad Only'. Start on the surface and click out a square. CTRL+A to deselect, then click an edge. Holding CTRL, pull one out and you will make a new polygon. If you drag one edge to another it will snap and bridge across.

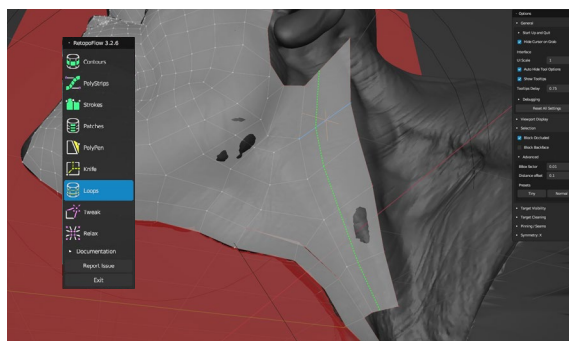
21 FILL IN THE BLANKS

Work around the main loops of the model. This includes the eyes, the mouth, the nostrils and in this model, the bone showing through on the skull. Once you have the loops all positioned (with symmetry on) you can start using the PolyPen to add the sections in between. Use Relax and Tweak as needed and work across the entire head filling in the blanks. With the eyes and mouth work up to the edges, but don't go inside as there is other geometry showing through there. You can fill those in later with tools like Extrude and Bridge.



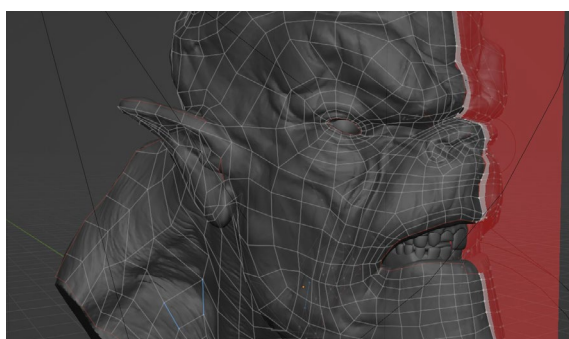
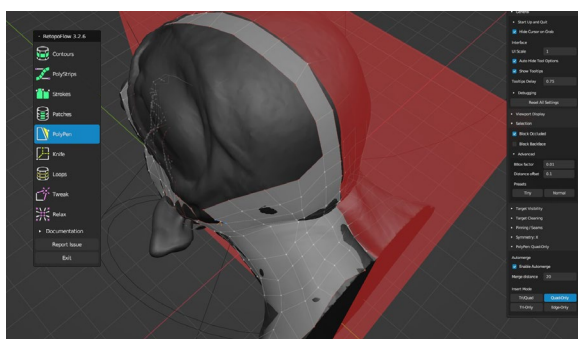
22 JUST RELAX

Once you have a large section complete, switch to Relax, which will tighten and smooth out your edges and make the overall retopology look less jagged and erratic. It also helps you to identify if you need to make any changes before you move on to another section. If you do bits of it as you go, there won't be as much to do once the retopology is completed.



23 THE NECK

The neck has some large muscles and you need to follow the flow both up, down and around where possible. Use the PolyPen tool, and maybe some PolyStrips or Strokes to make new areas of geometry. Use whichever tool works best for the area you are detailing, then stitch them together with PolyPen. Work around the back under the ear and onto the back of the neck area.



24 FINALISE

Lastly, fill in the less important parts. Work around the back of the head. Try and follow the large muscle groups and keep the flow going with loops where you can. Work into the ear and make a solid ear, back and front. Work over the top of the head from the back and join it up at the forehead, sealing the entire model. Now use the Relax tool again and tweak any stray vertices.

25 FINISH WITH BLENDER TOOLS

To finish up, turn symmetry off. Then exit from RetopoFlow. Use the normal Blender tools to mirror the mesh across. The Mirror modifier works well and you can apply that to make it permanent. If there are any odd geometry issues, just use the basic mesh tool to clean them up. You can turn off the teeth and eyes and seal behind the eye with Extrude and Bridge.

PolyPen master

This is the workhorse of RetopoFlow for me. I can do almost the entire retopo with just this one tool. It really does carry you almost over the finish line by itself.



26 PROJECTION AND SHRINKWRAP

The final job is to now project the detail back from the sculpt to the new retopologised head. Start by adding a Subdivision Surface modifier and a Shrinkwrap modifier. Increase the Subdivision level to about 3 or 4. Then in the Shrinkwrap modifier, add the 'Head' as a Target and change the settings to On Surface or Outside. This will subdivide the retopologised head and make it conform to the shape of the base sculpt. ●



AUTHOR

Vahid Ghobadi Arfai

Vahid is from Iran and has been working in the CG industry for nearly nine years.
artstation.com/vahidghobadi



**WATCH
THE VIDEO**

<https://bit.ly/3D-world-unreal5>



MAYA | MARVELOUS DESIGNER | ARNOLD | PHOTOSHOP

MODEL A MECH FROM CONCEPT ART

Transform 2D to 3D with **Vahid Ghobadi Arfai's** step-by-step guide, focusing on the art of mech modelling

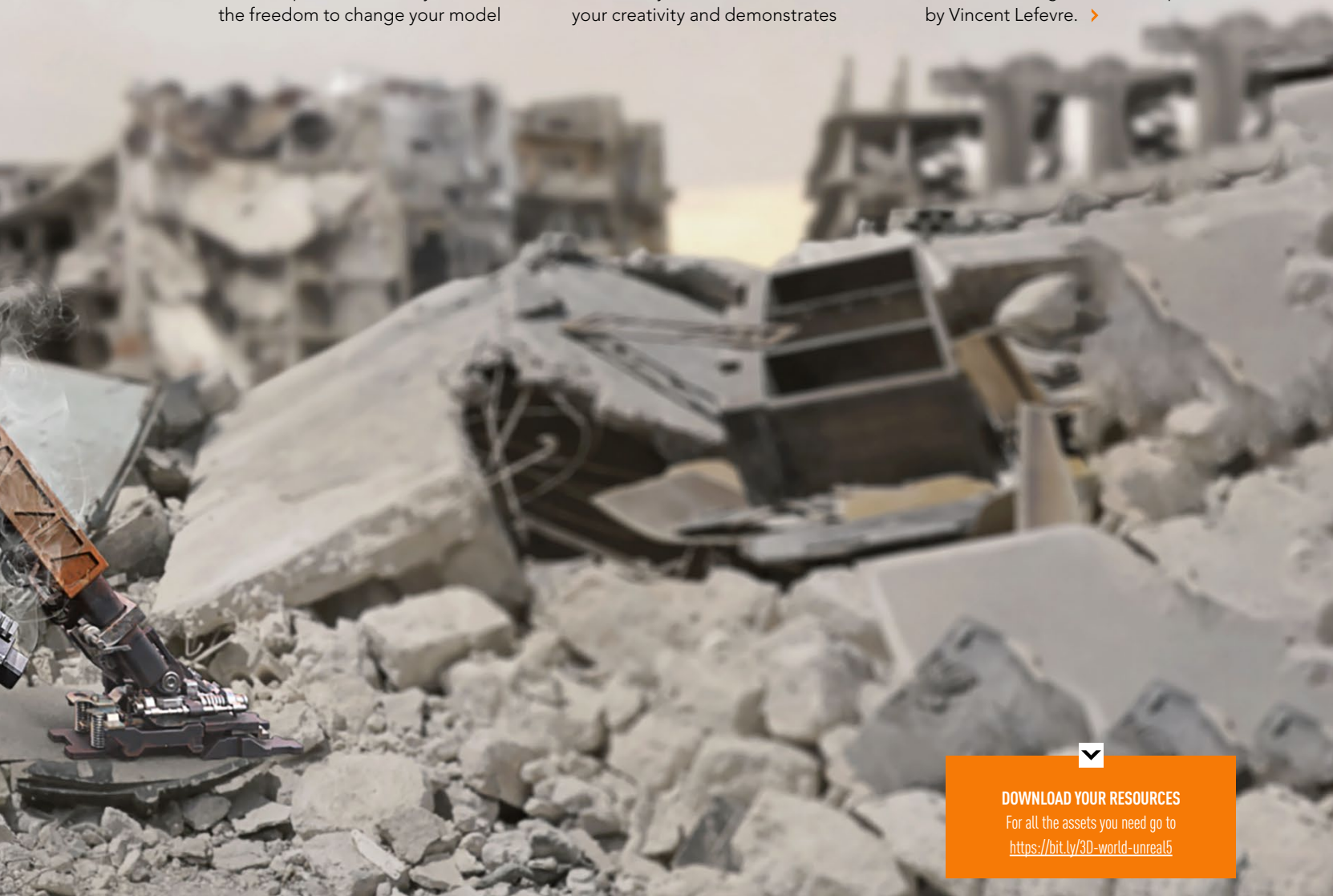
As a modeller, you always hear about the importance of developing a strong portfolio – but how? An important skill to demonstrate is the ability to work based on a concept. In most companies you will likely be required to work with concept artwork, and you'll have to follow all the shapes and forms. In personal works, you have the freedom to change your model

and make the process easier, avoiding some of the tougher challenges, but at work you can't avoid them. Proving to recruiters that you can model from a 2D concept is vital for your portfolio.

In 2D sketches, there are so many hidden parts – areas that are in shadow, behind objects, under surfaces and so on. Creating these areas with your 3D model shows off your creativity and demonstrates

that you can understand the style and intent behind the concept. Furthermore, any new elements added to the 3D model need to be seamless with the design of the original art.

In this tutorial, I will take you through my steps for producing this mech model, which I translated into 3D from the original 2D concept art by Vincent Lefevre. >



DOWNLOAD YOUR RESOURCES

For all the assets you need go to
<https://bit.ly/3D-world-unreal5>

01 CHOOSE A COMPLICATED CONCEPT

Don't fear a challenge; this is a personal piece and there is no tight deadline. Feel free to choose a complicated concept and focus on your modelling. Experiment with new tools and new techniques, search on the net, watch tutorials, and enjoy failing.

Curved shapes are challenging – making them smooth and even without any bumps or hollows is very tricky. Choose a concept with both curved surfaces and complex details. Mine is this amazing piece of art by Vincent Lefevre.

02 BLOCK OUT AND BLINN

It's very important to block out your model, make a simple rough model and correct the scale and proportion. Start modelling from the big parts that play key roles in the overall shape. If proportion and scale go wrong, even adding a ton of details can't save your model and it's not going to look like the concept. For checking the surfaces, apply a Blinn shader to your model and examine it from different angles regularly, it helps you find uneven planes easily. After finishing the big parts, check the proportion again and correct it if needed.

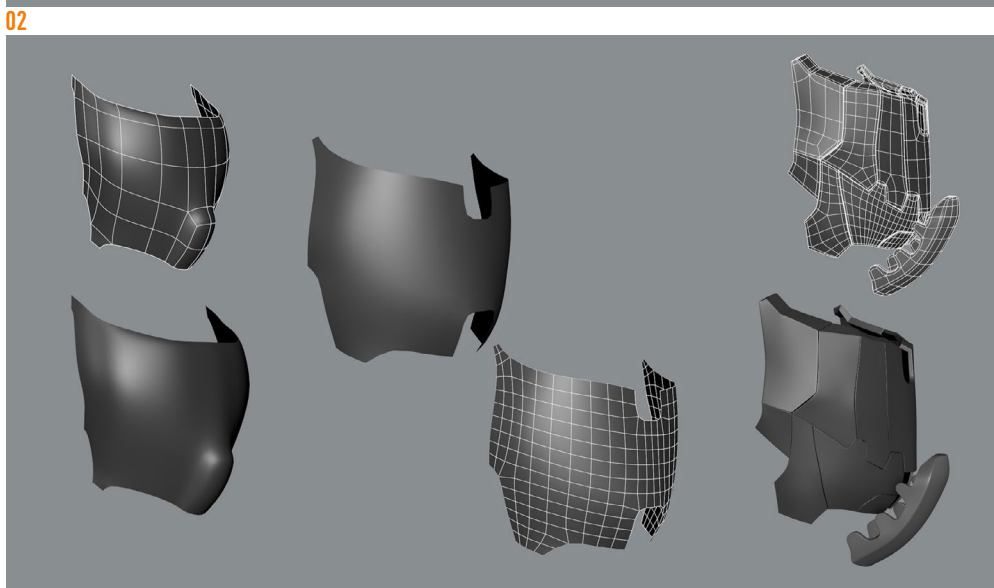
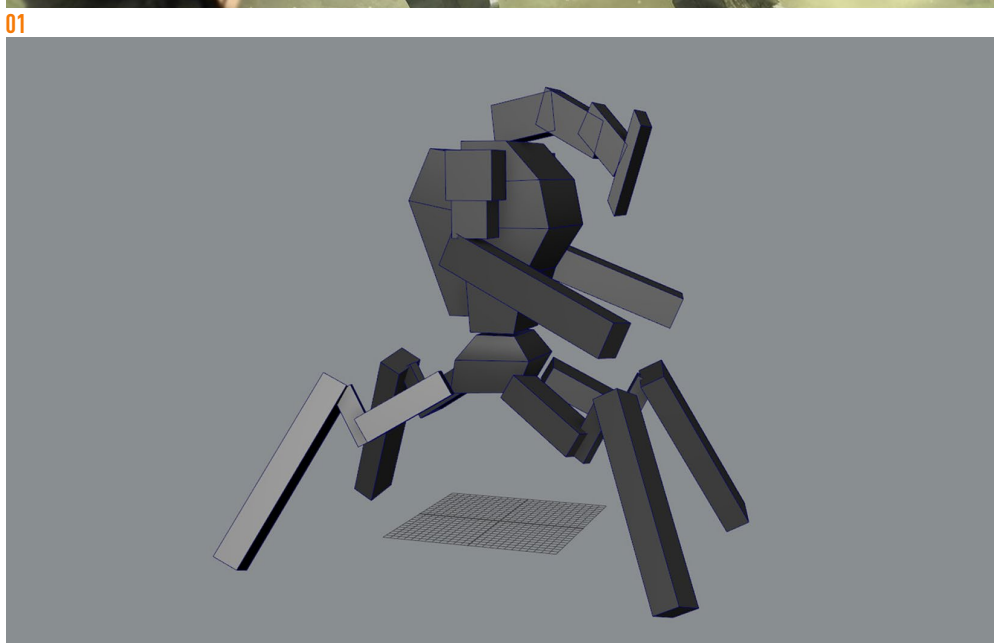
03 IGNORE TOPOLOGY

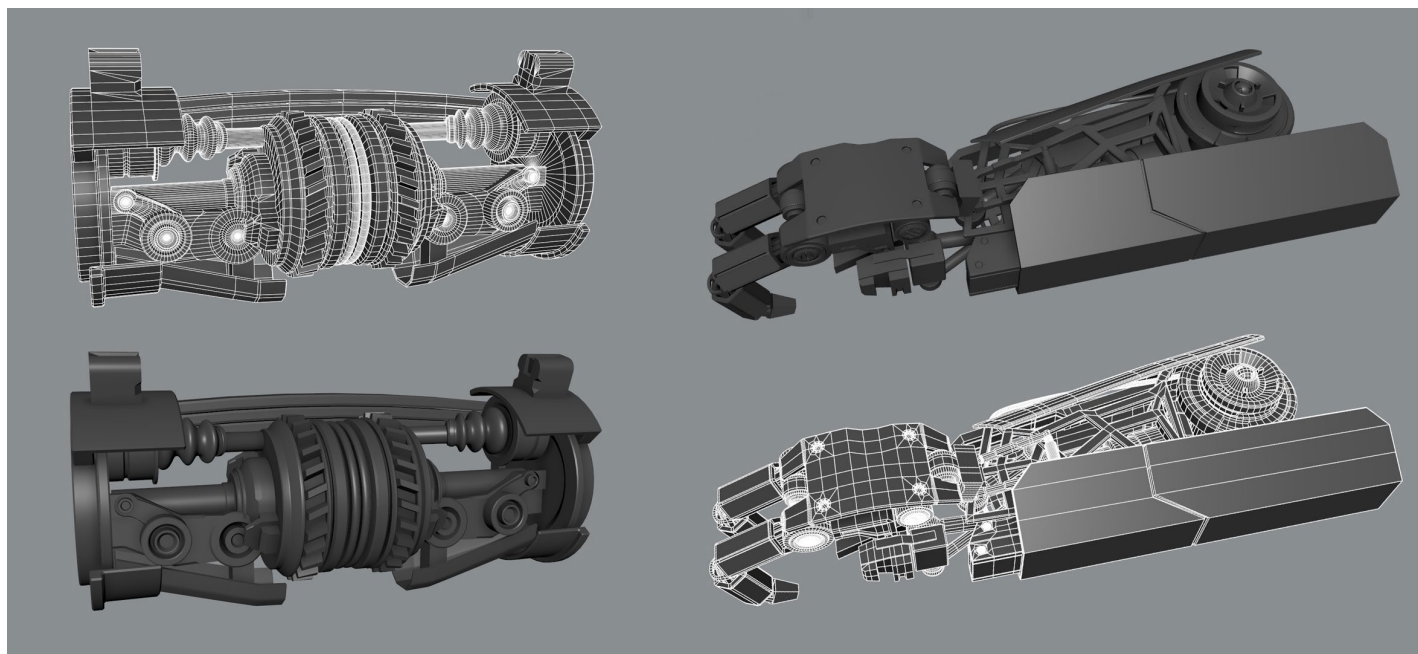
Finish up your model, creating an eye-catching shape with even, curved forms. You do not need to worry about the topology and edge loops. Don't waste your creativity on working towards clean quads.

To improve my surfaces, sometimes I make a high-poly model and then retopologise and cut it as needed; I used this technique for the mech's chest part.

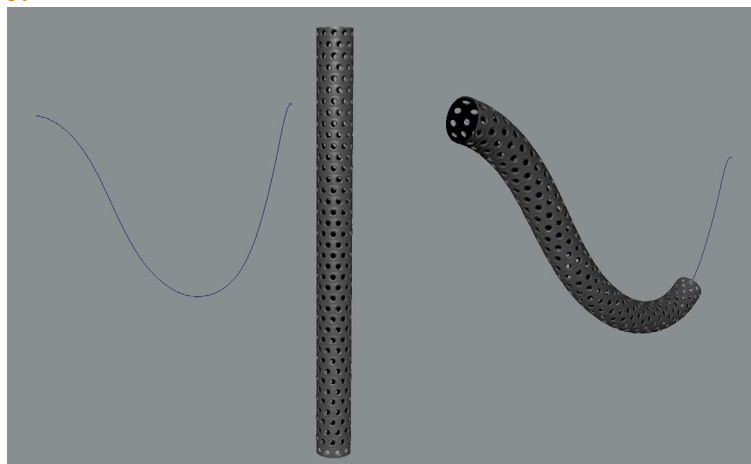
04 BE CREATIVE AND LOYAL

When modelling, you will come across areas that have not been designed in the 2D concept, and you will need to add certain pieces by yourself. Here it's important to be loyal to the original concept. Pay attention to the sharpness of the edges, forms and curves, the bevel of the edges and the overall style of the original work. Copy certain areas so that when adding any new elements, viewers cannot recognise the differences





04



05

between what you've added and original parts. At the same time, be creative and try to make new, complicated parts, too.

05 ADD PIPES AND WIRES

You can improve the realism and believability of your mech by adding pipes and wires to your work. Depending on the situation, for making the pipes and wires I use either Bonus Tools or Curve Wrap.

Using the Bonus Tools is easy: create a curve, then go to the Bonus Tools menu, press Modeling, then Curve to Tube Mesh. There are some options that you can then tweak in the Channel Box. Just remember to press Cleanup Ribbon/Tube Mesh at the end, in the same menu, as this will remove all unnecessary constraints.

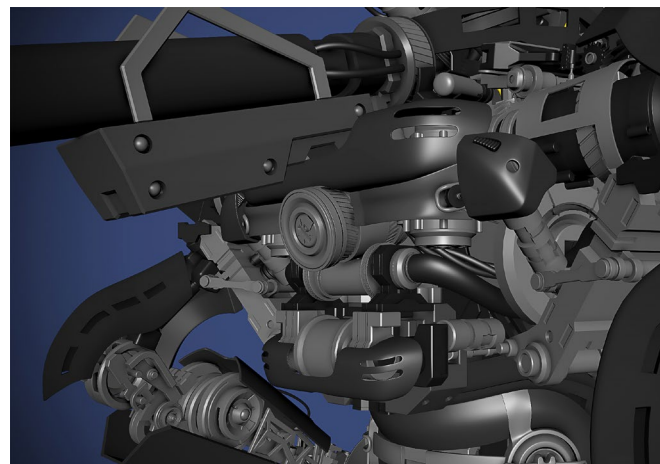
If you need a specific pipe or wire, Curve Wrap works the best.

Make your complicated pipe geo in straight form, then create a curve, select both of them, go to the Deform menu, and press Curve Wrap. You can modify it by changing the attributes in the Channel Box.

06 CREATE PIPE COVERS

Using Marvelous Designer, we can add some covers to our pipes and wires for a more attractive quality. First of all, create a Cylinder in Maya with enough subdivision, export it as OBJ, and import it in Marvelous Designer as an avatar. Make a cover for it using the Remesh option to clean topology, export it and then import to Maya. In Maya, move both the Cylinder and cover to 0,0,0, then freeze all attributes.

Create your own curve, go to the Curves menu, and rebuild the

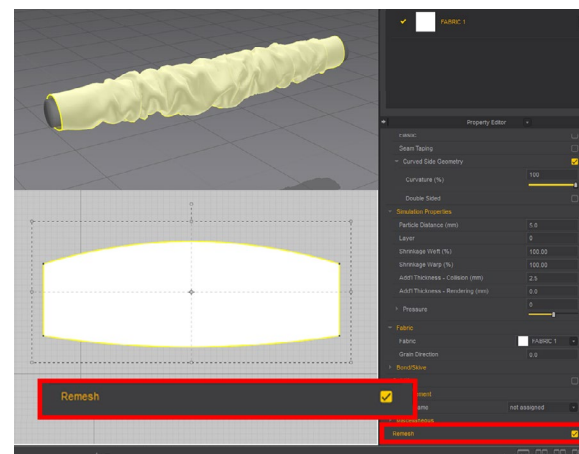


Curve Wrap bug

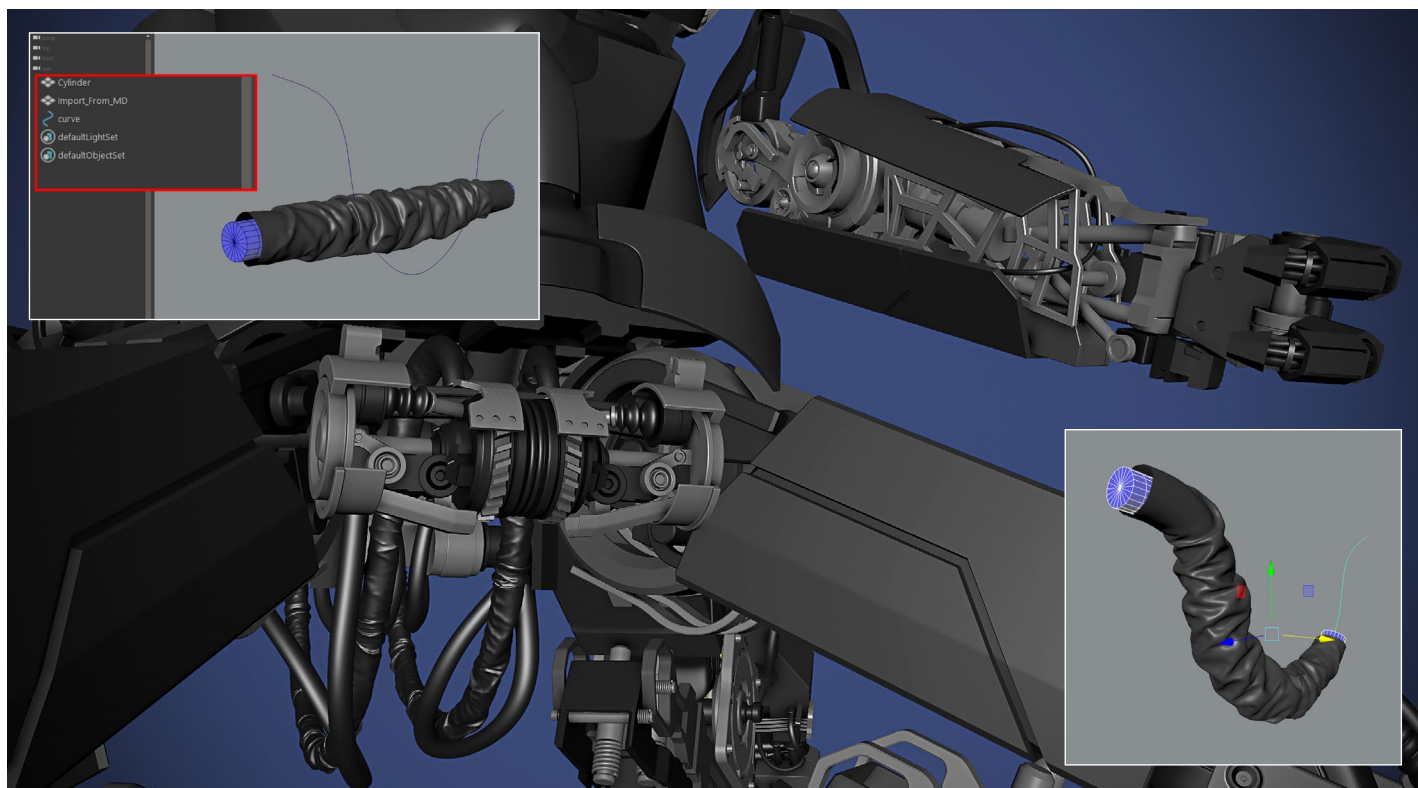
If you find that your wrap doesn't work properly, move your curve and geo to 0,0,0 and freeze all attributes. Delete history, then try again.

curve to make it smooth. Delete history. Select the cover, then select the Cylinder and go to the Deform menu, and press Wrap.

Now, select the Cylinder and the curve, then go to the Deform menu and press Curve Wrap. By changing the Length scale and Max scale, >



06a



06b

> in the Channel Box, you can now adjust as desired.

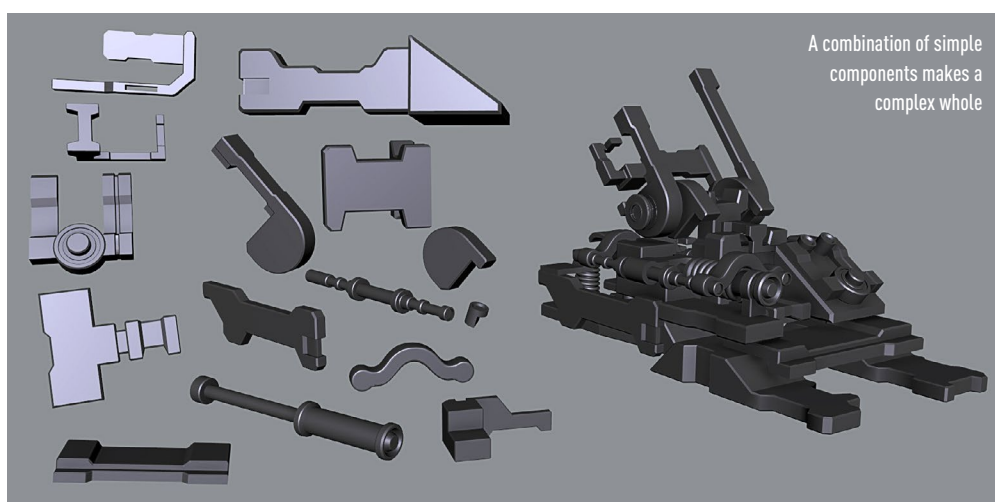
07 ADD DETAILS AND CLEAN UP

You're a modeller, so make sure to show off your modelling techniques and prove your ability. It's obvious that it's possible to add so many details in the texturing process, but this is a personal project and you are improving both your modelling and your portfolio.

Try to make a variety of pieces; some artists will create a part, then simply duplicate it many times – but you're a modeller, not a duplicator. Add details cleverly; in some dim areas you can add details with the primitive geos, like a box or a simple sphere. In other parts, you can use other techniques like a negative extrude on the surface, making a gap or a bump or adding contrast to the edges – and don't forget to follow the concept.

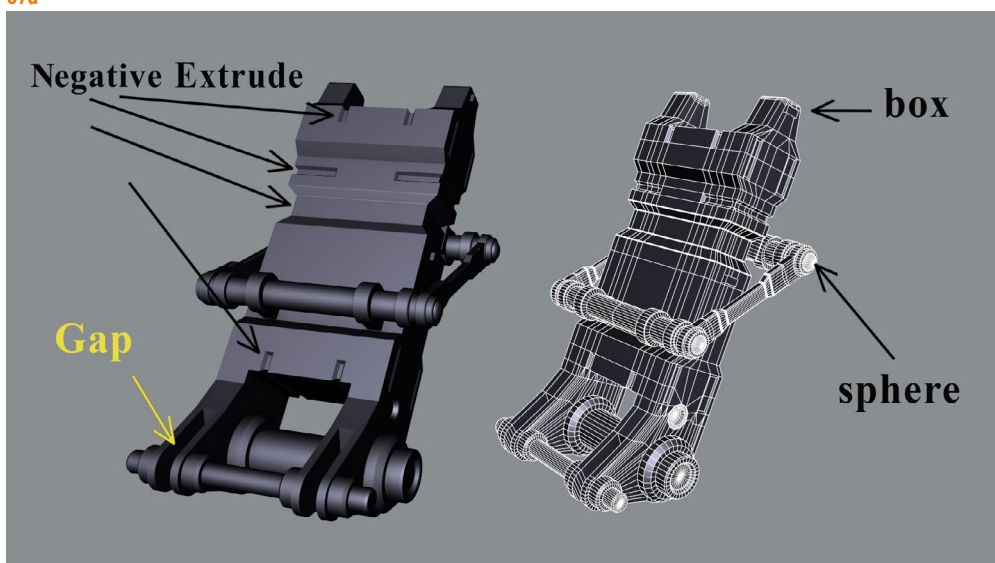
08 SAVE TIME WITH KITBASHING

After finishing a piece, keep it in your own library. Having a kitbash library is very useful, especially when it comes to areas that are not very obvious or you need to fill up some free space – kitbashing will help to save valuable time.



A combination of simple components makes a complex whole

07a



07b

09 RENDERING AND PRESENTATION

Showing that you know how to UV or texture is significant. However, you don't need to do it for all your models. Using Photoshop for texture painting is very quick and easy for presentation. Usually, I render my model with different materials: rusty, matte and shiny metal, plastic, and with different colours. For render layers, usually I use AO, specular, shadow matte or direct lighting, as well as object ID to have easy selection in PS –

some AOVs like Crypto_material

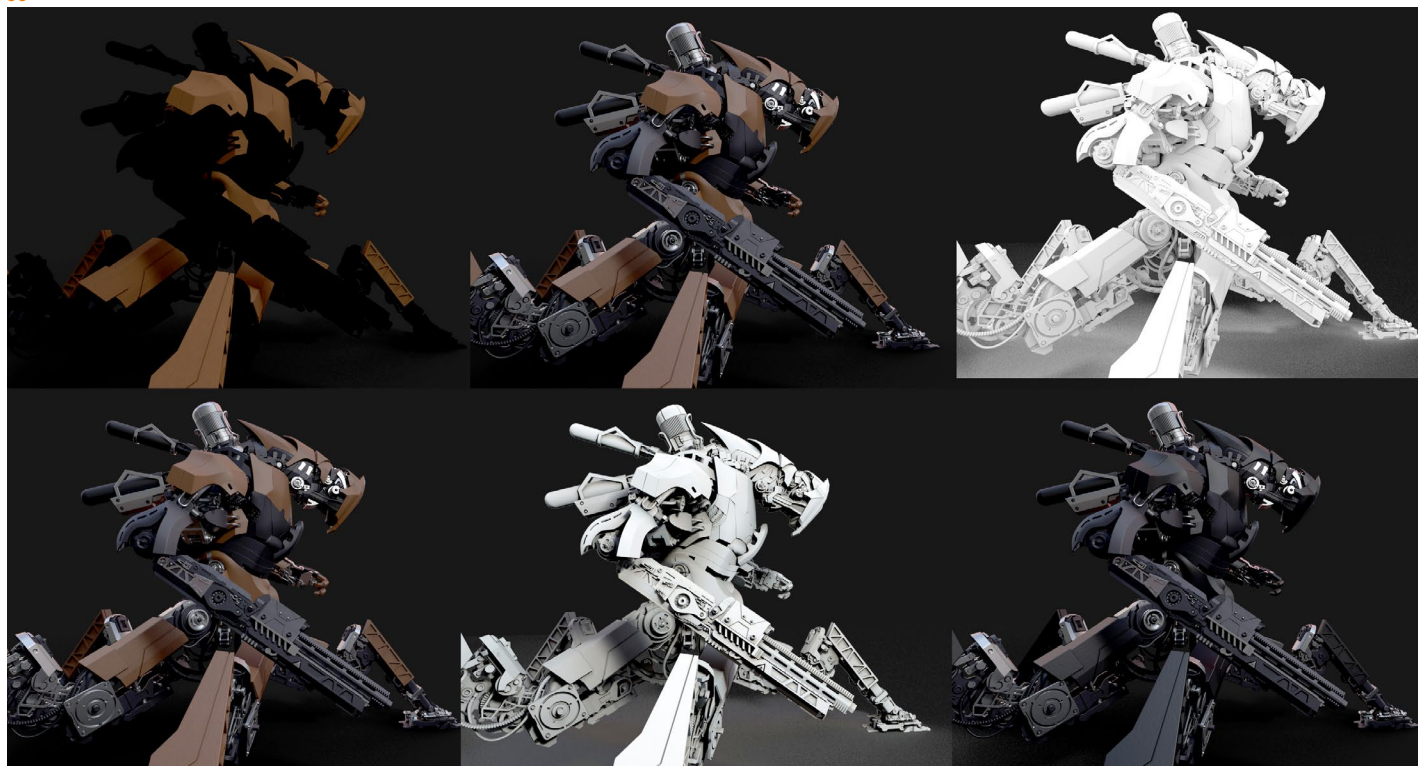
work very well for this reason too. Then in PS, I import some textures on my render. In Overlay, Multiply or Screen mode, using a layer mask, I paint what I want on my render. The

main tweaks at this stage involve adding contrast to different parts and changing the colours to make them more obvious. I spend so much time on this stage.

If you like, you can also mix some photos and add a background too, which helps to build the narrative. In addition, by matching your render to the background, you get a better understanding of colours and lighting. ●

Add bits and pieces to your own kitbash library to help when building future models

08



09

Artist Q&A

Practical tips and tutorials from
pro artists to improve
your CG skills



Mike Griggs

Mike Griggs is a digital content creator with over two decades of experience creating VFX and CGI for a wide range of clients.
www.creativebloke.com



Glen Southern

Glen runs SouthernGFX, a small Cheshire-based studio specialising in character and creature design. He has been using and training ZBrush in the UK for over 15 years.
youtube.com/c/SouthernGFX/videos



Pietro Chiovaro

Pietro is a freelance 3D artist and YouTuber. An expert in the creation of game assets and environments, he shares many of his creations on his channel.
www.pietrochiovaro.com

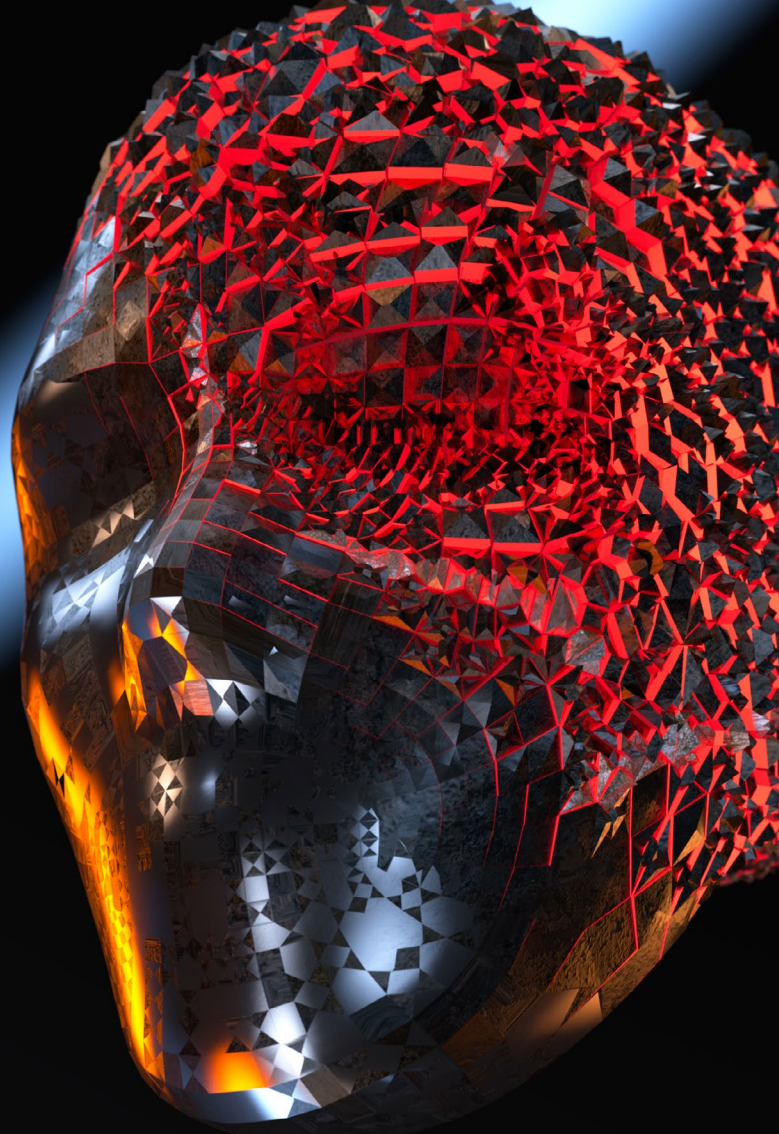


Antony Ward

Be it game development, rigging or recording in-depth courses for his YouTube channel, Antony boasts experience in most areas of 3D.
www.antcgi.com

GET IN TOUCH

EMAIL YOUR QUESTIONS TO
rob.redman@futurenet.com



SOFTWARE: CINEMA 4D | INSYDIUM FUSED

HOW DO I CREATE A COMPLEX GEOMETRIC PATTERN IN CINEMA 4D?

John Collins, Reading



Mike Griggs replies

Finding inspiration when modelling can be tricky, not to mention time-consuming, especially when trying to meet deadlines while making everything look fantastic.

Maxon's Cinema 4D has an excellent reputation for being one of the quickest and easiest 3D content creation tools to help artists meet their goals, while at the same time maintaining a high quality of creative output.

One of the reasons Cinema 4D has this reputation is the excellent ecosystem of plugins that complement and enhance the core feature set.

Premier among these plugins is the Fused collection from Insydium, which has become an indispensable part of many

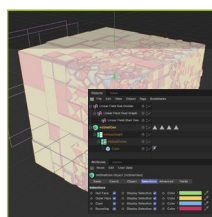
Cinema 4D artists' toolsets, from the incredible X-Particles simulation system to landscape and foliage generators. A tool in the Insydium collection will help with most Cinema 4D tasks.

For example, the task of adding complex geometry to an existing surface without using textures or maps – the Insydium Fused MeshTools provide a variety of ways of doing just that.

In this tutorial, the mtSubDivider, mtShellGen and mtDualGraph, all tools within the MeshTools plugin, are used to add geometry to a simple Cinema 4D parametric Cube Object.

The mtSubDivider does precisely what it says and subdivides the underlying mesh, but provides ways of localising the

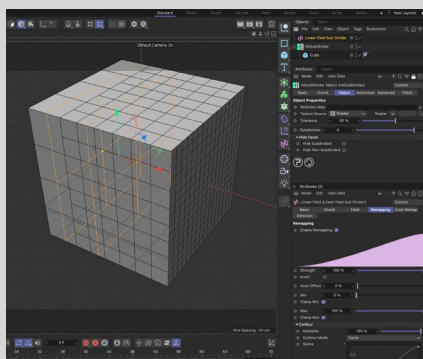
EXPERT TIP



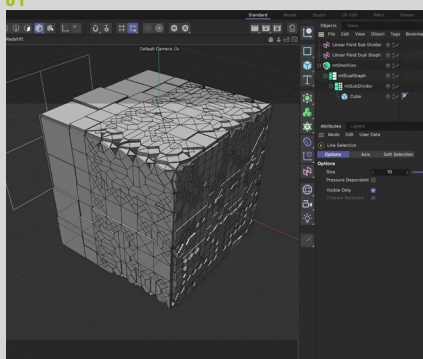
USING SELECTION SETS

All of the MeshTools shown can output selection sets based on the topology they create. Use these to create interesting secondary effects or to apply materials to only the desired parts of an object without the need to select them manually.

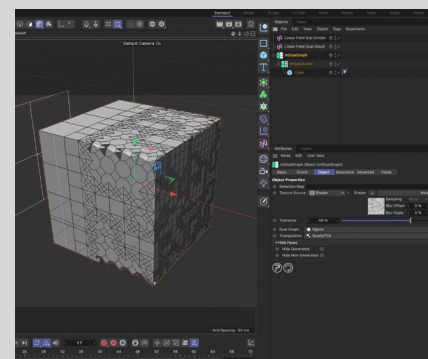
STEP BY STEP CREATE UNIQUE GEOMETRY WITH INSYDIUM FUSED



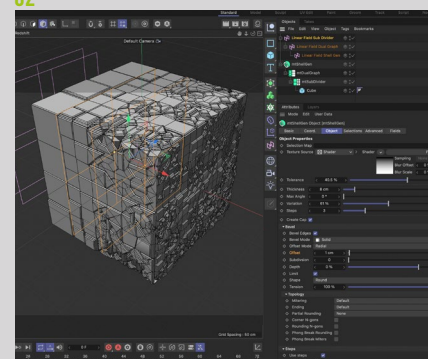
01



03



02



04

Using the MeshTools in
Insyidium Fused, you can create
complex 'faded' geometry

subdivision using shaders, textures and/or Fields (this is true for most Insyidium MeshTools plugins).

The mtDualGraph Object adds interesting geometric topological patterns to the underlying Cube. mtDualGraph does this by adding new polygonal data, either triangles or n-gons, at the intersection points of the underlying geometry for some interesting results.

The mtShellGen adds a 'thickness' to the geometry and also bevels the topology. Steps can be added to the bevelling effect meaning that one mtShellGen Object can control a complex modelling hierarchy.

As previously mentioned, the MeshTools can work with a wide range of tools within Cinema 4D to localise each effect. For this tutorial, a separate Linear Field is used for each MeshTool, allowing the artist the ability to art direct the level of growth. As the Linear Fields are 'Objects', Cinema 4D can integrate them into its powerful animation toolset. This enables complex animations to be created in minutes, either using traditional keyframes or the wide variety of procedural animation tools available within this creative toolset powerhouse.

01 APPLY THE MTSUBDIVIDER

For this tutorial we have used Maxon Cinema 4D R25 with Insyidium Fused build. First up, a Cube Parametric Object has been added to the scene. It has been made a child of an mtSubDivider Object, with a Subdivision level set to 4. A Linear Field has been added via the Fields attributes tab of the mtSubDivider Object, and its Contour mode is then set to 'Curve'.

02 NEXT UP, THE MTDUALGRAPH

To create patterns within the subdivisions, an mtDualGraph Object is added, and the existing object tree is made a child of it. A Noise is added in the 'Shader' dropdown in the 'Texture Source'. The Noise is set to VL Noise, and the Space is set to Object.

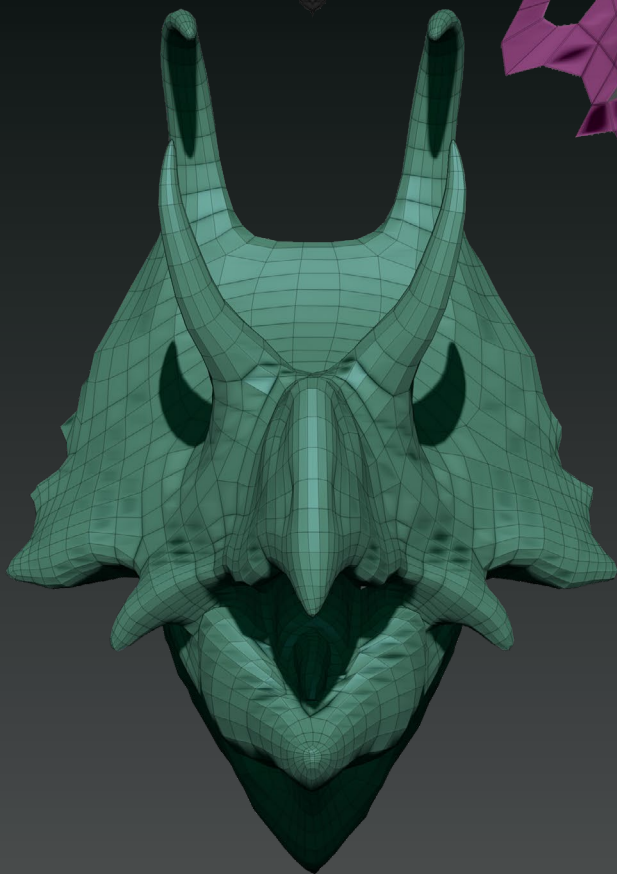
The Dual Graph option is set to Ngons and the Triangulation set to Quads/Tris, and a Linear field is added using the same settings as the mtSubDivider.

03 ADD THE MTSHELLGEN

To provide relief on the Object's surface, an mtShellGen Object is added as a parent of the existing object structure. Instead of using a Noise as a Shader, this time, a Fresnel is applied to give a different graded effect. Adding a Thickness and reducing the Max Angle creates a 'flat' effect on the generated topology. Adding variation and steps helps with this as well.

04 BEVEL USING THE MTSHELLGEN TOOL

Switch on the 'Bevel Edges' toggle to allow more relief detail to be created via stepped bevels. The amount of steps is controlled via the 'Steps' input. When the key parameters are entered and a Linear Field has been created, adjusting the 'Tolerance' can alter the effect to your choosing. This applies to every one of the MeshTools Objects. Animating the Linear Fields will grade the effects on and off.



EXPERT TIP

USE THE RIGHT TOOLS

There are many ways to skin a triceratops! Here we are using ZModeler, the Topology Brush, ZRemesher and lots of basic ZBrush functions. Take time to learn each tool and understand the benefits and issues that come with doing that particular method.

SOFTWARE: ZBRUSH

CAN I RETOPO MY SCULPTING IN ZBRUSH OR DO I HAVE TO GO TO A THIRD PARTY APP?

Mat Wilson, Cheshire



Glen Southern replies

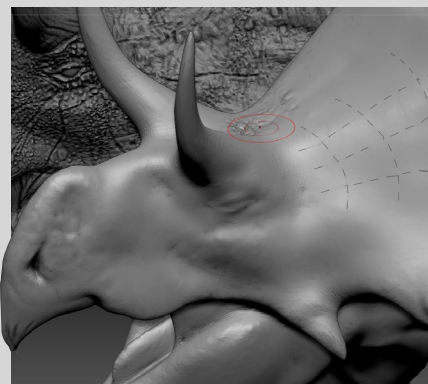
ZBrush has had a retopology system for quite some years, but it has never really been adopted by the mainstream CG community. Not everyone is aware that ZModeler contains enough tools to actually do a really good job of retopologising even the most complex of models.

You will need a basic knowledge of how ZModeler works, but it's not that difficult to learn. You can activate it with keyboard strokes if needed. B for Brush, Z for any brushes starting with Z, and then M for ZModeler. Once it's activated, if you hover over any of the three component types you get access to a set of tools and features broken down into actions, target and then modifiers. It does feel a little clumsy on your first go, but once you understand how it works it becomes as second nature as sculpting.

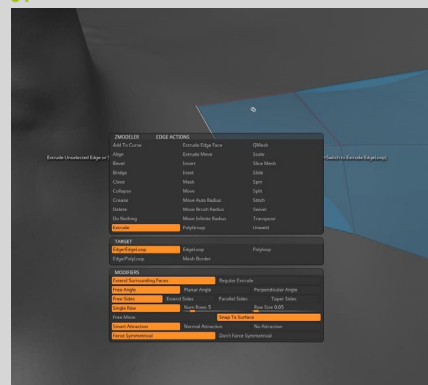
There are quicker, more automated ways to make clean topology in ZBrush but retopologising has distinct advantages. ZRemesher is an industry renowned process to generate topology with a single click, and it does have some control of where the loops go with another feature called ZRemesher Guides. However, it is still nowhere near as accurate as being able to map out your topology by hand. With the ZModeler method you use the point, edge and face components to extrude out edges and have them adhere to the surface of your high-polygon sculpt. You can snap points and edges together and even define polygroups to polyloops to make selection a breeze.

Using ZModeler, you can change modifiers to make things snap to a surface, or have them just move freely in 3D space. Of course, the important part of retopology is having things snap to another model, so we need that setting on for most of the retopology session. If you begin to like this method of retopology, you can assign all of these features to a new brush and even save that out as a Retopology brush. When you want to do retopology you can then simply load your own custom brush with all these settings already applied.

STEP BY STEP RETOPOLOGY WITH ZMODELER



01



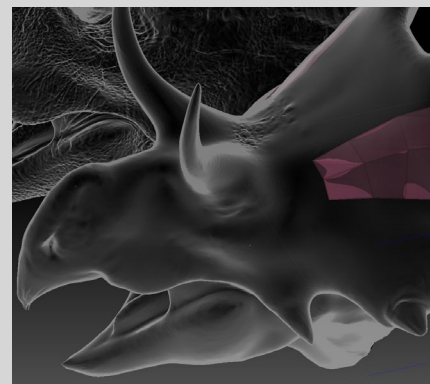
03

01 MAKE SOME TOPOLOGY

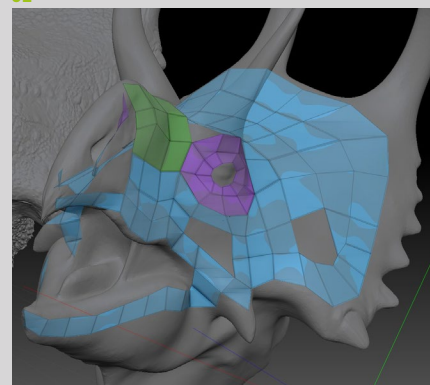
The first thing you need is a high-polygon sculpt to make new geometry on top of. I'm using a Ceratopsian head here and I've smoothed it to make it easier to see. To make a start, press B-T-O. Now you can use a pen to draw out some lines that become your first bit of geometry. Tap on the head to make the geometry good to go.

02 SNAP TO A MODEL

Ctrl-click+shift on the piece of geometry to hide the head. Now go to Tool>Subtool>Split Hidden and you will have some geometry and a head as separate subtools. You can change the visibility at the right side of the menu to Transparency, and turn off Ghost so you can see the geometry that will become the retopology mesh. Next activate ZModeler with B-Z-M.



02



04

03 ZMODELER

The ZModeler brush works by hovering over either a point, an edge or a face and pressing the spacebar. This then activates a set of actions, target and modifiers. This sounds complex, but after a few goes it's very simple.

The main thing we are going to be doing is extruding edges. Hover over an edge. Press the spacebar. Now select Extrude in Actions and under Modifiers select Snap to Surface.

04 TIME TO RETOPO

That essentially gives you most of the tools you need to map out your new topology. You can also hover over points and set that to Move so you can snap points together. Map out the head as you need for the job at hand. Remember to add Edge Loops for the eyes and around the mouth area.

SOFTWARE: SUBSTANCE DESIGNER

HOW CAN I CREATE A TILE MATERIAL USING SUBSTANCE DESIGNER?

Jack Horn, New York



Pietro Chiovaro replies

I will show you a simplified version of my tile material. I selected the Physically Based (Metallic/Roughness) Graph Template and deleted the Metallic output since it isn't necessary for this substance.

We can start the creation of this material by adding these nodes from the Substance Designer library: the Brick Generator pattern (the main node that will help us to define the shape of the tiles), the BnW Spots 3, BnW Spots 1 and two Cells 2 noises, the Normal filter, five Levels filters, two Blur filters, three Blend filters, a Warp, an Invert Grayscale filter and last but not the least the Gradient Map filter.

Now we can link these elements, starting with the Brick Generator placed at the beginning of the graph. This one will be linked with the Warp filter in which we will connect the BnW Spots 1 followed by the first Blur. Now we can connect the Warp to the first Levels and this one to the background/opacity of the Blend filter.

In the foreground, we have to connect the BnW Spots 3 followed by the second Blur. Then we have to connect this Blend with the background/opacity of the new Blend; the only difference is that in this case we will link the Cells 2 noise to the foreground of the Blend noise. After that, we can connect the Blend noise to the Gradient Map and consequentially this one to the Base Color output.

Now we can continue the nodes for the creation of the Normal Map. Connect the Blend filter to another Levels, which will be linked to the background of the third Blend filter. In contrast to the previous links, we have to make a middle connection between the Levels and the opacity of the Blend filter; in this case, we have to place an Invert Grayscale filter.

In the foreground of the Blend we have to connect the second Cells 2 noise generator followed by the fourth Levels filter. Now we can connect the last Blend filter to the Normals filter, and then we can link it to the Normal output.

Lastly we have to link the two Levels filters to the Roughness output and to the Height output.

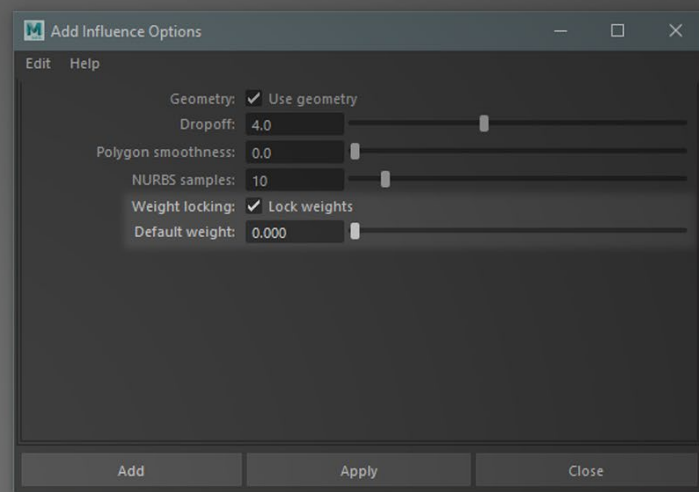
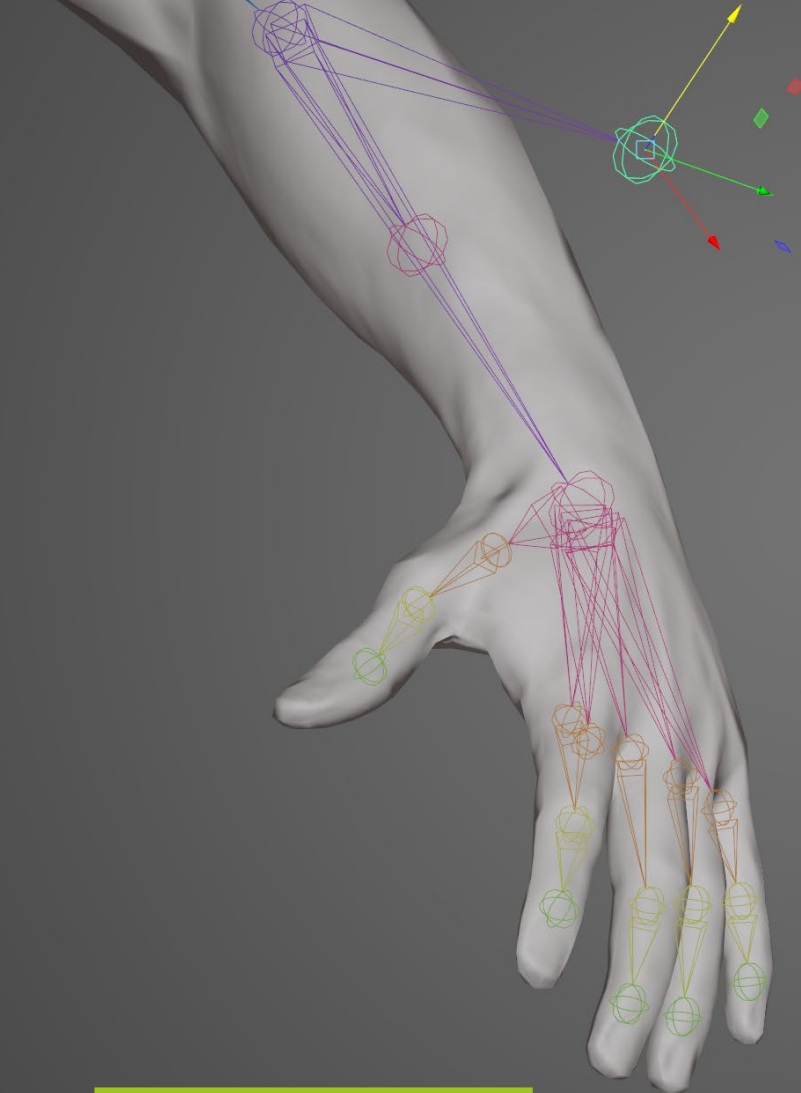
EXPERT TIP

THE BLUR FILTER

In this material node, thanks to the Blur filter we can smooth the edges of the tiles and create a more realistic curvature around the corners. This filter can be used in several situations to decrease the influence of certain nodes in relation to others.

You can see a more complex version of this material with several nodes and links in the provided video





The thought of adding an influence to a completed rig can strike fear into the heart of any technical artist, but there is an easier way to do it

SOFTWARE: AUTODESK MAYA

HOW DO I ADD A JOINT TO A SKINNED MODEL WITHOUT LOSING MY WEIGHT VALUES?

Brandon Tobin, Oxford



Antony Ward replies

When working on any project, be it for a game or visual effects studio, you can expect your rigs to be constantly evolving. As the project moves through its various stages, features are inevitably added, so the character rig then needs to be updated to account for these. This could be adding a single joint to aid deformation or extending a rig to add an accessory or body part, but if not done correctly, this could end up being more work than it needs to be.

The problem is, once you've spent days refining a character's skin weights you don't want to then add more joints to the skin cluster, something that can result in the weights being changed and sometimes lost.

It's not all doom and gloom because there are steps you can take to preserve your weighting information. For example, you could export the weight values and

EXPERT TIP

UNLOCK THE JOINT WEIGHTS

Because you locked the weights to preserve the rest of the model's values, you may not be able to edit them. To unlock your new influence, simply click the small padlock icon, which will be yellow, next to the joint's name in the Paint Skin Weights tool.

reimport them, but doing this with Maya's native tools doesn't always give you the same results, so you may need to go in and fix any problem areas.

The good news is that there is an easier way to add joints to your rigged model without touching your existing weights.

As you may already know, to add a joint to an existing skin cluster you first make sure the joint and model are selected and then use the Add Influence tool found in the Skin>Edit Influences menu. By default, this will add the joint to the influence list,

but it will also replace the weight values, reverting them back to a default state, so you unfortunately lose all your hard work.

To avoid this happening, you can simply check the Lock Weights box and then set the Default Weight slider to zero. Now when applied, your joint will be added to the influence list but with zero weight values, plus all the existing weights will remain untouched.

You can now use the Paint Skin Weights tool to gradually add the influence of the new joint.

FACE STUDIES

Software Gravity Sketch, Photoshop

Year made 2022



Technique focus

Incredible 3D artists take us behind their artwork

MODEL IN VIRTUAL REALITY I used a VR headset and a program called Gravity Sketch. I did 3D drawing and then modelled my face according to it. This is why VR is comfortable for me; after making a good drawing, you just fill the spaces with geometry. Gravity Sketch is great for handling both techniques.

I started with big shapes and defined the proportions. After that I started slowly adding features to make a basic head (you can see it in shadow on the right side of the image). After that, I found a few references for each expression and did drawings in virtual reality on top of the basic face. I then transformed features of the face to match the drawing of expressions.

If I can suggest something to fellow artists, it is to start from big, general masses with no details and features, and slowly break them up to get the desired final result. Start from primary shapes, then break down to secondary shapes once you're happy with the first stage. Continue to break down until you get the look you need.



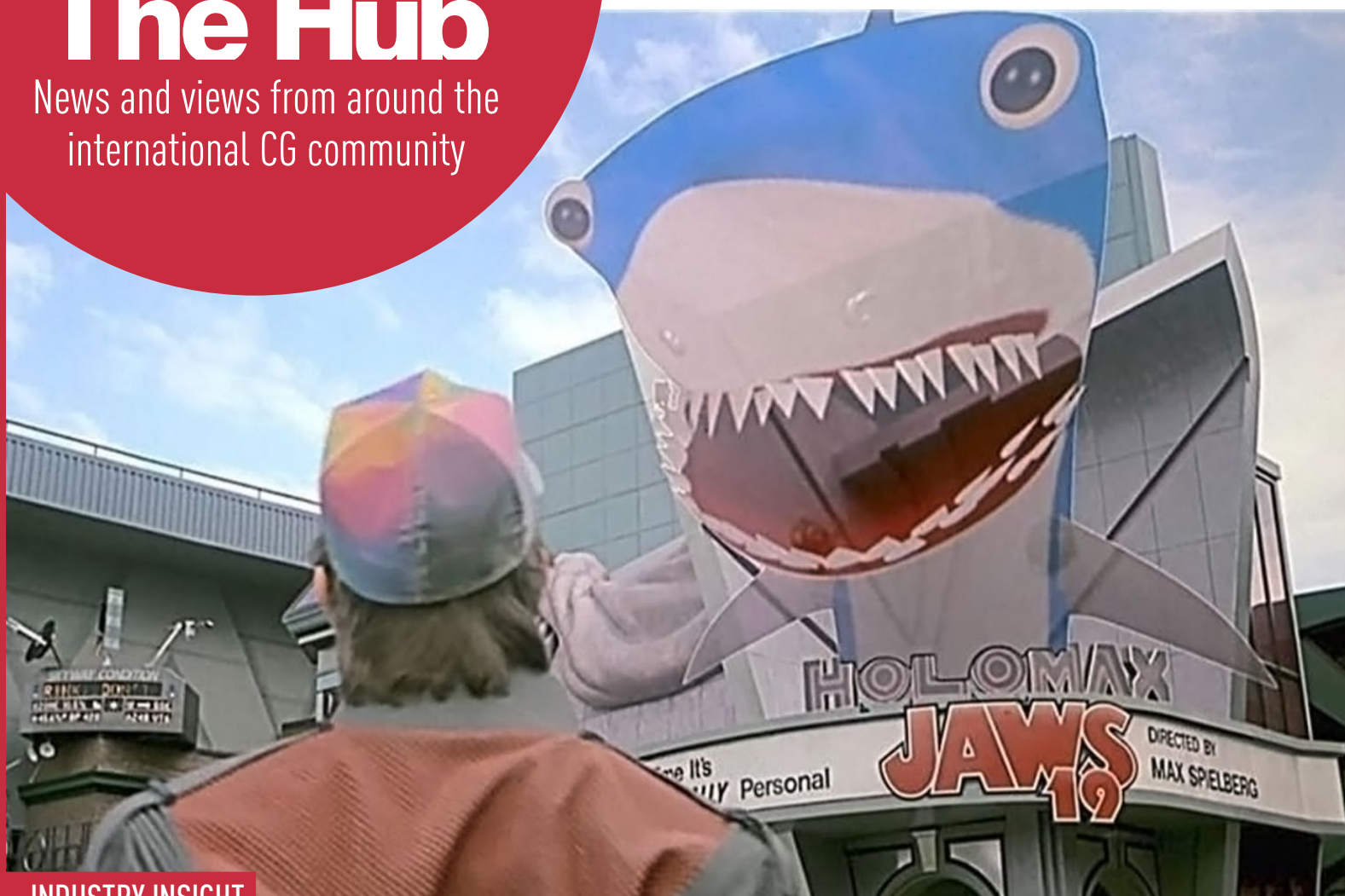
Sergey Grechanyuk
artstation.com/grekqss

Concept artist from Ukraine, working in the movie and game industries. I also do illustrations and personal work. Most of my 3D work is done in VR, in Gravity Sketch.

GRECHANYUK

The Hub

News and views from around the international CG community



INDUSTRY INSIGHT

The history of the hologram in pop culture

From Star Wars to volumetric video, we explore advances in holographic tech

This May marks 45 years since cinema-goers were introduced to the concept of holograms, thanks to a lowly moisture farmer in a galaxy far, far away. Rather than heading off to the Tosche Station to pick up some power converters, young Luke Skywalker became the recipient of eight words that changed his world — and ours right along with it.

Although *Star Wars* didn't invent holograms, *Star Wars: A New Hope* was what educated the public on what holograms were, and more importantly, what they could be. Like flying cars and hoverboards, audiences accepted that it was an inevitable technology.

It's been a few years since the rebellion landed on Luke's doorstep, but the image of a 3D Princess Leia made an indelible mark on the public. As we are reaching a point where science fiction is becoming more science and less fiction, we look back at the history of holograms in pop culture.

THE MAKING OF A HOLOGRAM

A hologram begins with the beam of light emitted from a stabilised laser. As it travels, the light bounces off of something it is illuminating and creates an interference pattern, which is caused by overlapping lightwaves. That pattern is then recorded, and from that a hologram can be produced. Naturally, there's more to the science behind it, but that's the basic idea.

Holograms can come in all shapes and sizes — from a simple image on an ID (including official seals added to make documents harder to copy) to bringing deceased musicians back to life to play Coachella (RIP Tupac). In fiction they've gone much further, but we are now starting to catch up.

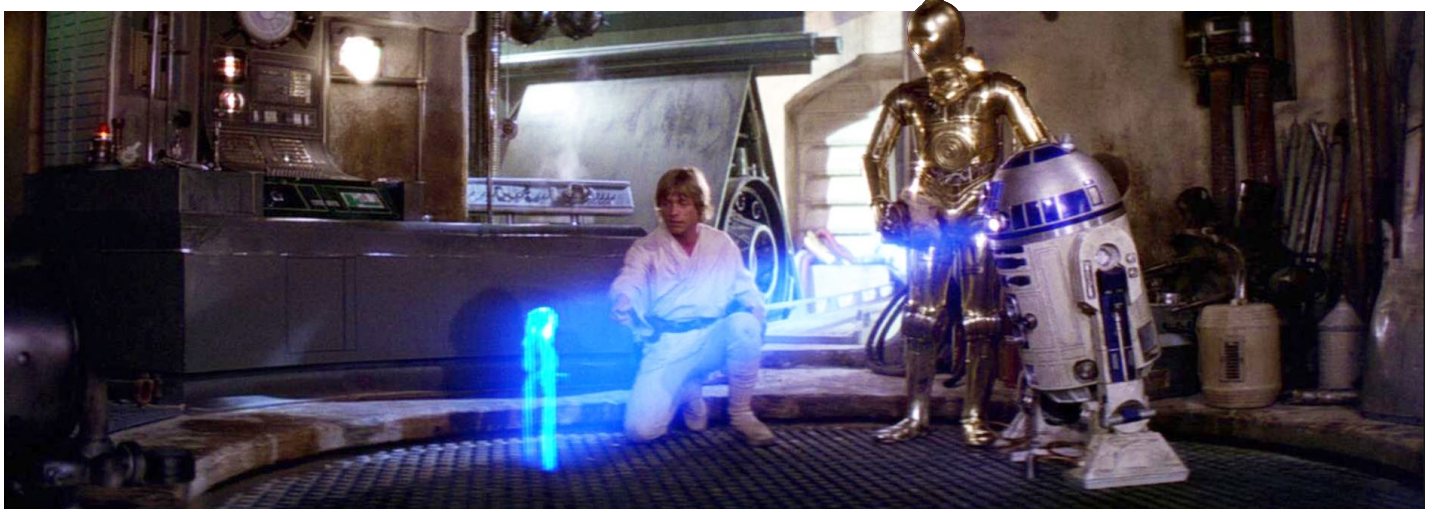
TECHNOLOGY OF THE FUTURE

Although the recording of Leia (and the holographic chess game Dejarik that Chewy and R2D2 play) is arguably the earliest and most famous instance of a hologram on film, it wasn't the first. That honor goes to the Sean Connery cult classic, *Zardoz*.

The 1974 John Boorman film, featuring a bizarrely dressed Connery and a



“THE FILMMAKERS [ON *LOGAN’S RUN*] TOOK THE IDEA OF HOLOGRAMS SERIOUSLY, HIRING ONE OF THE LEADING HOLOGRAPHIC SCIENTISTS IN THE WORLD AS A CONSULTANT”



confusing plot involving something about immortality and stone gods, is generally considered to be the first film to feature holograms, thanks to special rings shown to project holographic information. It’s not an especially auspicious beginning for holograms in a film that’s been lovingly called “cinematic garbage”, but all ideas need to begin somewhere.

Holograms next appeared in the 1976 film *Logan’s Run*, where they established another first: the first time an actor performed opposite a hologram.

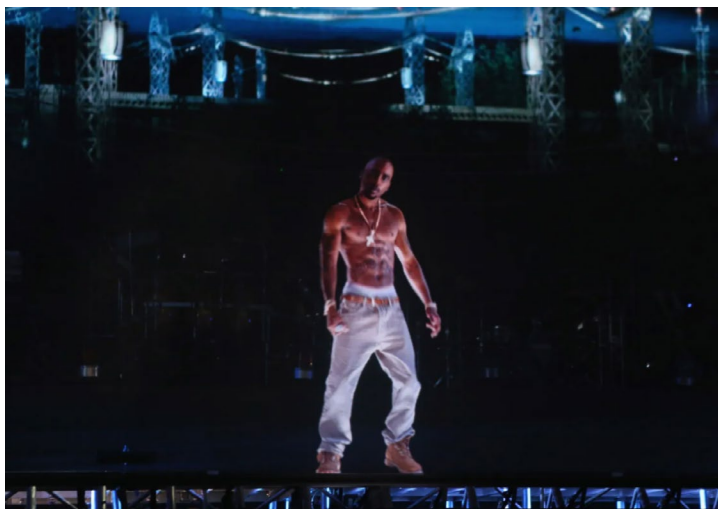
Although significantly less hairy than *Zardoz*, *Logan’s Run* also featured a mix of post-apocalypse and futuristic tech. Unlike the earlier film where holograms simply conveyed information, in *Logan’s Run* they

are used to represent something never seen before. During an interrogation, the character Logan (played by actor Michael York) has his mind split into multiple fragments, each represented by floating, rainbow-coloured versions of York’s head featured on screens located around the interrogation room. It was an outlandish scene, but the filmmakers took the idea of holograms seriously, enough so that they hired physicist Chris Outwater — one of the leading holographic scientists in the world at the time — as a consultant.

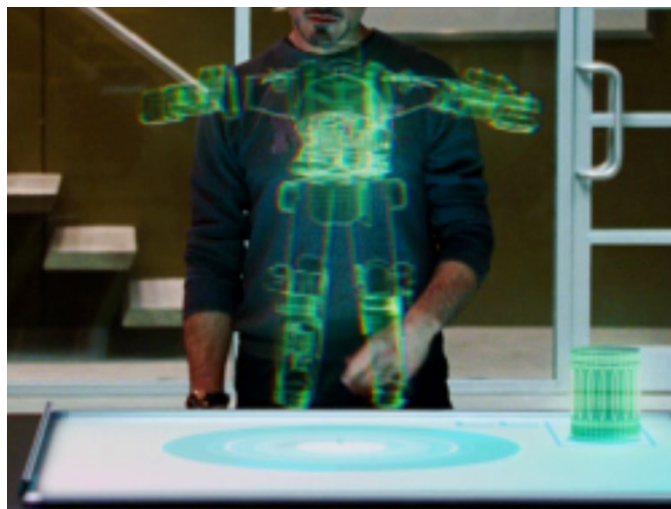
Then in 1977 *Star Wars: A New Hope* hit the big screen, quickly becoming a defining moment in pop culture. It was followed in 1980 by *Star Wars: The Empire Strikes Back*, which also used holograms as

communication tools, giving the subject not physically in the scene a 3D avatar to speak with (and in one instance, see them get smashed by an asteroid). Holograms would become a recurring tool for the *Star Wars* filmmakers throughout the years, appearing on a regular basis for conversations between separated characters.

By the mid-80s, holograms had become an accepted tool of the future, offering several potential uses. Whether it was Marty McFly cowering from a holographic *Jaws* promo in *Back to the Future Part II*, holographic store greeters in 2002’s *Minority Report* or holographic displays used to build superhero suits in 2008’s *Iron Man*, one thing is certain — holograms have very much become mainstream. ➤

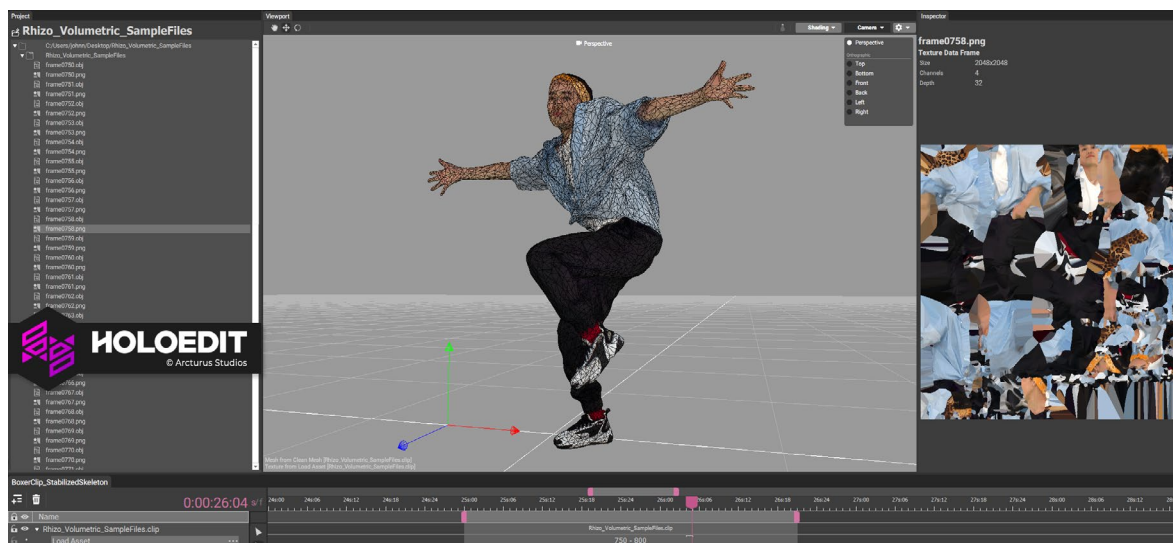


Above: Coachella 2012 saw a digital Tupac perform onstage alongside Snoop Dogg and Dr. Dre in an iconic moment for the future of holographic tech



Above right: Tony Stark designs his Iron Man suit with the help of an interactive holographic interface

Right: Arcturus' HoloEdit tool for volumetric video is an accessible method of creating and editing a holographic performer



ALL EYEZ ON HIM

Fictional examples of holograms in film and television are extensive, but they are starting to pop up in the real world too (well, sort of). The caveat being they have required a significant amount of setup, and there is some debate about whether or not they fully fit the true definition of a hologram. Technicalities aside, they can be spectacular.

One of the best examples of holograms in the wild hit the public via Coachella in 2012, when a hologram of the long-deceased rapper Tupac Shakur took the stage. To create the first-of-its-kind performance, Oscar-winning VFX studio Digital Domain was called in to create a CG digital human recreation of the rapper (with the blessing of his estate). Artists used real-world reference materials to create a photoreal version of Tupac, down to the pores in his skin. Once the Tupac doppelganger was created, AV Concepts, the originator of the project hired by Dr. Dre, developed a way for him to appear in front of a crowd of thousands. But despite a (now deleted) press release that referred to the project

as the “Tupac hologram,” it wasn’t really a hologram at all.

It was actually an old optical illusion known as ‘Pepper’s Ghost’, where an image is projected to a piece of glass at an angle, and that reflection can then be placed elsewhere to appear holographic. Still, the pomp and circumstance surrounding the presentation did its job, and digi-Tupac became a new high-water mark for what a hologram could be.

LESS FICTION, MORE SCIENCE

Given our current level of technology, arguably the best-known application for holograms at the moment is through augmented reality (AR). It’s not quite Princess Leia — Luke didn’t have to wear special glasses or use a mobile device to see the recording — but it has whet the public’s appetite for more.

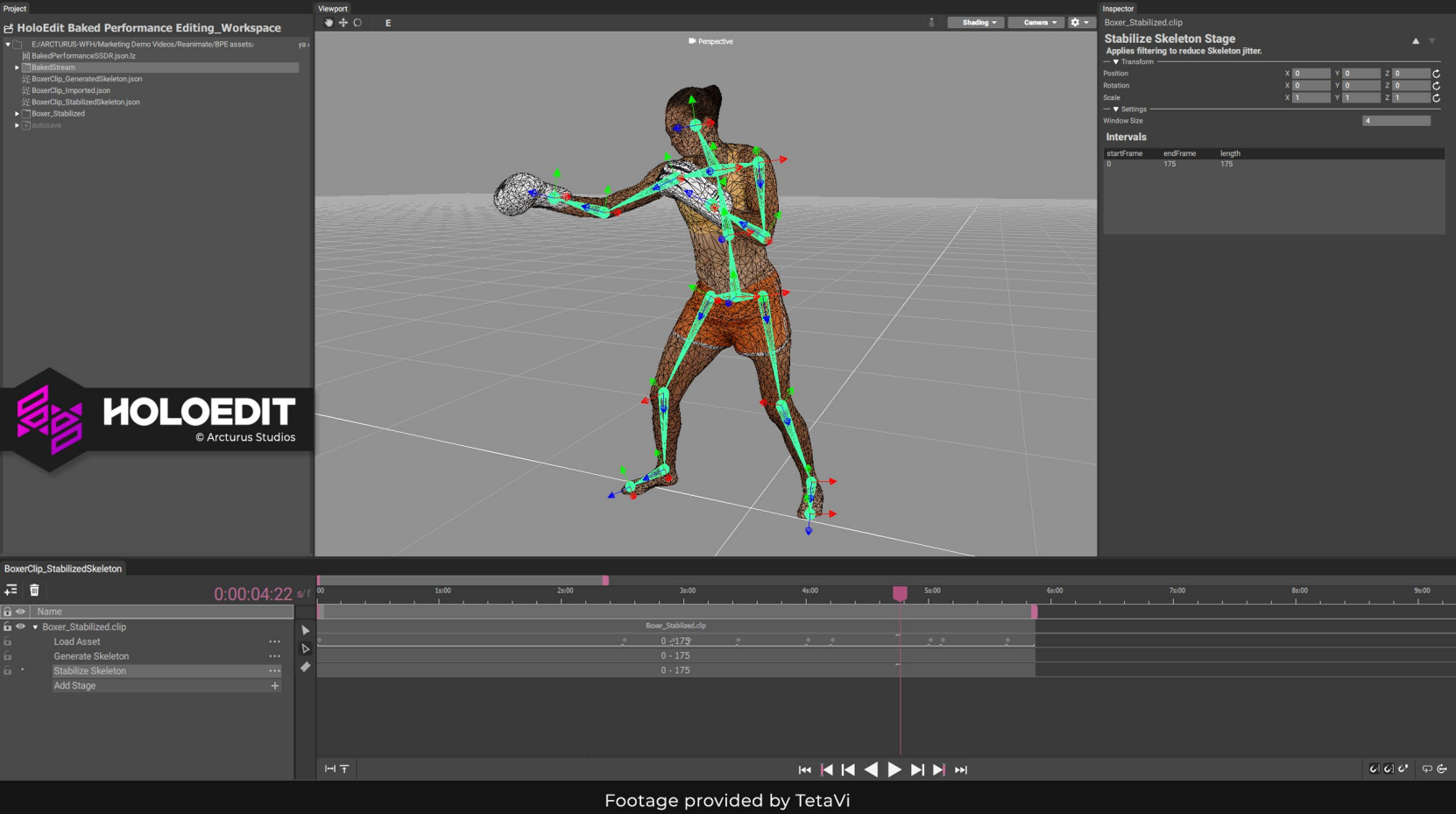
To create a hologram, assuming you’re making the hologram of a person and not an object, you need to begin with a recording. There are two primary ways to do this.

The first option is great if you happen to have a full VFX studio open to you. This

method begins with a scan of the subject, either using a full motion capture tracking solution including facial capture, or just the facial capture (a body can be animated later, if needed). Artists using a full VFX pipeline of tools can then go in and touch up the data, making the subject into a photoreal hologram for use in a 3D environment. The data can be transmitted onto a series of light beams in order to ‘project’ the 3D data into the real world, but that is less Leia and more optical illusion.

The other way to create a hologram is through volumetric video. This starts by taking a volumetric capture of the subject. The traditional method is through motion capture, but with the right equipment, the process becomes far more accessible. One of the fastest growing ways to take a volumetric capture is through LiDAR cameras, which are becoming increasingly available on commercial devices, including all of Apple’s new mobile devices.

Once the capture has been recorded, it can then be edited and eventually streamed using a single set of dedicated volumetric video tools, like the HoloSuite software



from Arcturus. Users can edit the data in HoloEdit, and adjust the subject as needed, even moving the head around to create proper tracking. And thus, a 3D hologram is born.

The finished file can then be uploaded into another tool, including game engines, or streamed directly to mobile devices. Holograms tend to hold a lot of information, so they are massive files, making them difficult to transmit. The HoloStream tool features adaptive streaming that adjusts to bandwidth, similar to what most major streaming platforms use, and it means you can watch directly on a PC or mobile device.

We're not quite at the point where anyone can record their own holographic message on a droid, but volumetric video has opened the door for holograms in several industries right now, including e-commerce, VFX and game character creation, autonomous humans and more. The next step is to do it all in real time.

TOMORROW'S TECH TODAY

Creating and streaming holographic content today is both possible, and becoming more

common all the time. The trick, however, is to do it all in real time.

It's one thing to record a live concert or a speech from a person then view the recording, but it's another to experience that live. That requires a massive amount of computing power. That doesn't mean it can't be done — far from it, and companies like Intel are betting heavily on creating the next generation of hardware that can handle this — it just means it's currently very expensive.

To witness the evolution of holograms, you may want to keep an eye on the future of sports. Modern stadiums all have dozens of

high-quality cameras encircling the action, which means there is enough data being generated to capture everything in 3D. Using tools like HoloStream it can then be broadcast, but processing it all in real time is difficult. The software is there, we're just waiting on the hardware costs to catch up — as they always do. And if a sporting event can be broadcast using volumetric principles and in real time, the ability to record yourself and communicate with others in real time isn't far behind.

**“VOLUMETRIC VIDEO
HAS OPENED THE DOOR
FOR HOLOGRAMS IN
SEVERAL INDUSTRIES...
THE NEXT STEP IS
TO DO IT ALL IN
REAL TIME”**

45 YEARS AGO, IN A GALAXY FAR, FAR AWAY...

To celebrate the 45th anniversary of *Star Wars: A New Hope* hitting cinemas, and the introduction of Princess Leia as a hologram, Arcturus Studios decided to commemorate the anniversary by creating a Princess Leia hologram of its own. You can access it by scanning the QR code found below.

And while we may not quite be ready to record our own holographic messages for delivery, we aren't too far off.



SCAN ME

Back to the Future - Credit/ Universal Pictures & Amblin Entertainment, Star Wars - Credit/ Twentieth Century Fox & Lucasfilm, Zardoz - Credit/ 20th Century Fox & John Boorman Productions, Logan's Run - Credit/ MGM & United Artists, Tupac - Credit/ AV Concepts & Digital Domain, Iron Man - Credit/ Marvel Studios & Paramount Pictures, QR code/Hologram Credit: Arcturus Studios, Metastage, and 8th Wall.

The art of CG battles

BlueBolt delivers fierce VFX for the final season of *The Last Kingdom*



Having been the lead vendor on all previous seasons, BlueBolt have completed the fifth and final season of historical drama series *The Last Kingdom*, delivering an impressive 782 VFX shots for the hit show produced by Carnival Films for Netflix.

The VFX requirements for this project were vast and varied and included elaborate environment extensions, sprawling CG armies, historically accurate CG ships, blood addition and modern cleanup.

Plus, a substantial amount of motion capture was used in this season, with BlueBolt purchasing two motion capture suits, allowing them to body track stunt performers and use these actions on their CG characters.

BlueBolt VFX supervisor, Richard Frazer, explains the importance of this. "When working on the large battle scenes, we would sometimes require our CG warriors to make very specific motions,

and this would often involve one of the VFX team at the office putting on the suit and performing that bespoke motion. This allowed for much more natural-looking movement in our characters and the ability to show them more prominently in frame than in previous seasons.

"We also spent additional time developing fur and hair simulations for these characters, which again increased our ability to show them significantly larger in frame whilst still looking photorealistic."

WORLD-BUILDING

In S5, the conclusion of the TV series, years have passed since the events of the last season, and King Edward is still forging ahead with his ambitions to unite the Saxon Kingdoms to fulfill his late father's dream. Although a long-standing peace between Danes and Saxons now exists, that harmony is under threat, not only by a new Danish invasion but a Saxon rebellion. Uhtred has been entrusted with protecting Edward's

illegitimate son, the future King of England, Aethelstan. But the treacherous Lord Aethelhelm has ambitions for his grandson Aelfweard, Edward's other son, to rule.

We follow Uhtred as he faces his greatest enemies, and suffers immeasurable loss, on his quest towards fulfilling his destiny. Meanwhile, Edward treads a fine line between peace-keeper and authoritarian as he battles to bring together the fractured Kingdoms of the land. In a surprising twist of fate, Uhtred discovers that the quest to unite England may well be linked to his own personal destiny.

BlueBolt played a pivotal role in the creative process from start to finish, beginning their involvement in the pre-production stages. Most of the scenes were filmed just outside Budapest, Hungary, with a handful shot in the UK. BlueBolt was heavily involved with the team during prep, the shoot and throughout post-production, delivering around 95% of the VFX shots in the show.

The VFX-heavy series opens with a group of warriors involved in a sacrificial ceremony amongst erupting volcanoes in Iceland. They then take to their boats and depart for the shores of England. This was all shot in a quarry and lakeside in Hungary, with BlueBolt creating the volcanic land of Iceland and its ocean through matte painting and compositing work.

In episode 6, the night-time Dane attack on the Saxon camp relied on VFX to increase the sizes of both armies and digitally extend the environment. BlueBolt also helped to enhance the moments when fleeing Danes fell through the lake ice.

The climax of the series in episodes 9 and 10 involves Uhtred and gang climbing along precipitous cliffs to gain entry to

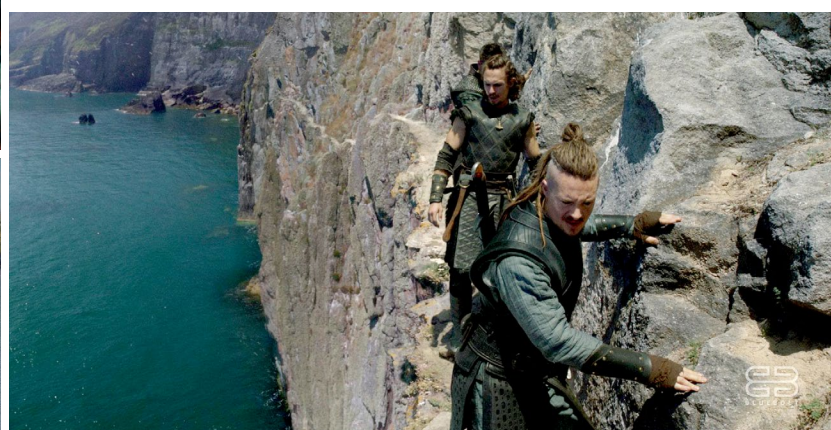
“VERY SPECIFIC MOTIONS WOULD OFTEN INVOLVE ONE OF THE VFX TEAM AT THE OFFICE PUTTING ON THE SUIT AND PERFORMING”

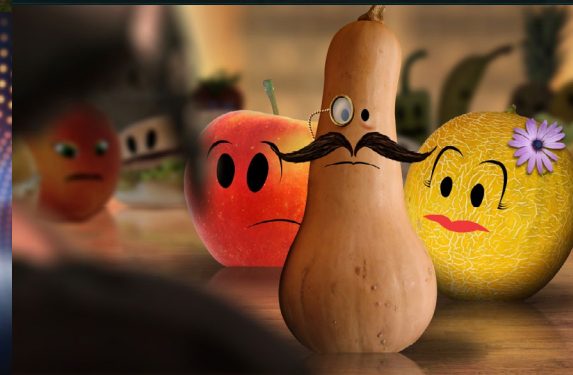
Richard Frazer, VFX supervisor, BlueBolt

the coastal fortress of Bebbanburg, as well as a large-scale battle outside the fortress that features soldiers being driven to the cliff and pushed over the edge. All of this had to be shot in the land-locked country of Hungary. BlueBolt found several coastal locations in north Wales to shoot plates of cliffs and sea, which were used to help

create the illusion of the Hungarian sets actually being atop a cliff in northern England. The team shot plates of stunt performers jumping from the top of a building into airbags to create the elements of falling soldiers.

FYI All five seasons of *The Last Kingdom* are currently streaming on Netflix.





A DAY IN THE LIFE OF A...

Filmmaker

Co-founder of Butcher Bird Studios, Jason B Milligan gives us an insight into his non-stop work day

Above:
A variety of projects and
styles from throughout
the last few years



NAME
Jason B Milligan

JOB TITLE
Pixel Sergeant

STUDIO
Butcher Bird Studios

LOCATION
California, USA

ABOUT
Jason is a freelance filmmaker in Los Angeles. His experiences span animation, design, visual effects, comic books, TV news, puppetry, directing, podcast hosting (*G.O. Get Outside*) and adventure filmmaking.

WEB
chinnystyle.com

Jason Milligan is a generalist with varied experience, having worked in news graphics, comic books and manga, puppetry, VFX, video production and animation. His favourite projects tend to meld multiple disciplines, especially those that combine techniques from 2D and 3D with live-action in stylised ways.

Jason co-founded Butcher Bird Studios in 2010 where he typically works as creative director amongst other responsibilities. Sometimes he gets to direct cats driving cars (true story) or operate cameras on a live sci-fi show. Recently, Jason has helped build out the virtual production capabilities of Butcher Bird Studios.

08:00am If it's a shoot day, I am likely already on set prepping

machines and gear and discussing the day's tasks with team members. It is also very possible we are troubleshooting a piece of tech that isn't working properly – even though it was the day before. On non-shoot days, I am probably rolling out of bed and facing the dilemma of breakfast.

09:30am By now, I am probably reviewing emails and seeing if any client notes came in overnight. Or I might be trying to wake up enough to get on a Zoom call and appear at least semi-professional. If we're on set, we have hopefully gotten everything working and are sitting back waiting on first shot or for the countdown to begin for a livestream. If not, we might be quickly applying solutions or workarounds to deal with that troublesome piece of gear that suddenly stopped working.

11:00am Sitting at one of the many computers I work from, you'll find me deep into today's project (or projects) jumping between various software packages – much of the Adobe Suite, Blender, Unreal, etc – as and when it's needed. I probably have many hours of desktop work ahead of me unless I get pulled away for a meeting, call, or review. If we're on set, we have started shooting or are currently streaming live. Whatever issue we had is either fixed or replaced with a viable solution.

13:00pm If it's a set day, it's lunch time! If I'm lucky I might get the whole hour to eat and socialise with the cast and crew, or I might slip back onstage to figure out why that piece of gear kept failing...

Is it October? Then it's the best time of day to do my daily Inktober drawing. Traditional skills are

FOSTERING GROWTH

Jason B Milligan on his key inspirations, and tips for becoming a versatile artist

Can you tell us about co-founding Butcher Bird Studios?

In 2010, four of us came together as a directors' collective to help each other complete personal projects and develop portfolios. This evolved quickly into client work. We realised we needed to become a business to be effective and financially protected. For the first few years, Butcher Bird Studios was a side job for all of us. Now it has grown into a production powerhouse, especially in the realm of live streaming. Though I recently left the company to return to my design and animation roots, we still work together frequently on select projects.

Does your passion for the outdoors inspire your work in VFX?

I try to be an active outdoors person. My main pursuits are climbing, canyoneering and backpacking, though I do a bit of everything. These activities require a lot of personal responsibility, problem solving, technical skill, and concentration. Whether it's priming my brain to process info effectively or allowing me to see from unique angles, I like to think these things positively impact my work. I also find myself observing tiny details in nature that later become mental reference or inspiration.

What advice would you give to those just starting out in VFX and filmmaking?

Something I constantly have to remind myself is that there is value in those skills or tasks I don't enjoy. The process of coding is torture to me, but every little bit I learn about it helps me immensely. Make yourself learn the things you don't want to. You'll be a stronger and more versatile artist. Also, learn to work effectively with constraints. You will never have the time and budget you want.

What do you enjoy most about your role?

I love creating things. You begin with little or nothing and end with something new in the world. Cooperation can be immensely rewarding. When multiple people join forces to tackle a creative task, something amazing can be born that none of those individuals would have or could have created alone. I have always adored animation and classic cartoons are my strongest influence. Giving the inanimate life and personality – especially if a viewer becomes emotionally affected by that creation – is true magic to me.



Orbital Redux

A live sci-fi series
(original Butcher Bird IP)
where I designed all branding, all
30+ animated monitor graphics
(including interactive tablet UIs),
and was a camera operator



important too. Not a shoot day? I'm probably even deeper into the project on my desktop, unaware of the world around me.

15:00pm Hopefully someone has saved me from myself and I have eaten lunch by now. Then, it's back to the machine because I need to get a render out to the client in the next few hours. Or, if no-one has reminded me, then I'll finally make myself grab lunch because my stomach won't stop growling. On set? We're either shooting the second half

of the day, prepping for the next day, or wrapping out.

17:00pm Somehow I've gotten everything done and I am preparing to render now. Time for a break, right? Nope. It either outputs surprisingly quickly but I notice a small error that needs fixing when I review it, or the render keeps crashing for no apparent reason. And then an email pops up with (surprise!) new assets and notes from the client. Do I need to incorporate these notes and assets right now? I'm going to be working late again, aren't I?

17:30pm Panic over. A few emails to and fro and everything gets sorted out. The assets are for a totally different project due in three weeks. The render is done! It looks beautiful and is off to the client immediately. Crisis averted. I'm off to the climbing gym! Wait, what? Our website just went down? Sigh. Let me see if I can find out why...

“GIVING THE
INANIMATE LIFE AND
PERSONALITY IS
TRUE MAGIC TO ME”



PROJECT INSIGHT

Fan-favourite villains return

We go behind the scenes with Digital Domain to explore their incredible VFX work on *Spider-Man: No Way Home*

If you haven't been keeping up with all things superhero at the cinema, then Sony Pictures and Marvel Studios' *Spider-Man: No Way Home* might be a little confusing. It's the 27th film in the Marvel Cinematic Universe (MCU), the 32nd property overall including the recent Disney+ TV shows (but not counting the Netflix/Marvel shows, despite the appearance of one of those characters in the film), and the third film in star Tom Holland and director Jon Watts' series. And those are just the obvious connections.

Along with its place in the MCU, *Spider-Man: No Way Home* is an unofficial sequel to both Andrew Garfield's *Amazing Spider-Man* duology directed by Marc Webb, and Tobey Maguire's *Spider-Man* trilogy directed by Sam Raimi (who, to add even MORE connections to this all, is directing the upcoming *Doctor Strange in the Multiverse of Madness*, starring Benedict Cumberbatch, who was also in *Spider-Man: No Way Home*). It can be a lot to keep track of – and not just for fans, but the teams that worked on the films. With this strong history of much-loved film franchises, starring fan-favourite actors, protagonists

and villains, it's certainly a challenge when it comes to revisiting these iconic characters for both old and new audiences.

A NEW DOCK FOR A NEW GENERATION

Oscar-winning VFX studio Digital Domain is no stranger to the MCU, having worked on several Marvel films and shows over the years, including recent additions *Black Widow*, *WandaVision*, *Loki* and, notably, *Spider-Man: No Way Home*, where it created around 700 VFX shots, 520 of which appeared in the film (and received an Oscar nomination for). Of the sequences the team worked on, the most famous is





the reintroduction of the villain Doc Ock (Alfred Molina) from *Spider-Man 2*. For fans, it was a welcome return. For the VFX studio, it meant creating a new character based on an older one.

“The original assets for Doc Ock’s tentacles were long gone, and the only practical set that still existed was in a display case in one of Sony’s studios,” said Scott Edelstein, Digital Domain VFX supervisor for *Spider-Man: No Way Home*. “We were able to get scans of the display models and we kept the new design very much in the spirit of the original, but we also had to update them and make sure they worked with the new film.”

When Molina first appeared as Dr. Otto Octavius, the tentacles were seen as having something of a life of their own. Molina encouraged that idea, and even gave each arm a name. In creating the new tentacles, Digital Domain kept that idea and further defined it. The upper tentacles, “Moe” and

“WE HAD TO UPDATE THE DESIGN AND MAKE SURE IT WORKED WITH THE NEW FILM”

Scott Edelstein, VFX supervisor, Digital Domain

“Flo” were the brains, while the lower set, “Harry” and “Larry” were the muscle. In *No Way Home* as Doc Ock is battling Spider-Man, Moe and Flo survey the battlefield and attempt to guess where the wallcrawler will be next, while Harry and Larry provide the movement and tear the bridge apart.

“We wanted to make sure Doc Ock appeared both fast and powerful, sort of like a terrifying machine that relentlessly pursued Spider-Man,” said Edelstein. “But we also needed to make sure it was grounded in reality, at least to a degree. The tentacles needed to move and retract in a natural way, and there was a constant sense

of scale and balance we strived for.”

Unlike Raimi’s 2004 film that featured a combination of practical and digital tentacles, the new version is entirely CG. To depict Doc constantly towering over the scene, Molina appeared on a wire harness or an elevated platform. For the artists at Digital Domain, that meant that along with adding the tentacles, they were removing and replacing the actor’s legs and a significant section of his clothes, and in some cases fully replacing him with a dig-double version of the actor.

The team also worked with production to combine practical destruction with





Left: Practical explosions met with CG models to help build the location of Spider-Man and Doc Ock's fight sequence on New York's Alexander Hamilton Bridge

Below: Digital Domain had to reconstruct the surrounding environment, including vegetation and neighbouring landmarks



- CG models – including several digitally smashed cars – to help introduce an old character to a new universe.

RECONSTRUCTING NEW YORK

The fight between Alfred Molina's Doc Ock and Tom Holland's Spider-Man is a pivotal moment in the film, and a major part of its marketing campaign – and with good reason. The sequence brings back a fan-favourite film villain, and it also helps to establish the plot of the film – namely that villains from other Spider-Man realities (aka other movies), are being pulled into the Marvel Cinematic Universe (MCU) due to a magic spell gone wrong.

The roughly seven-minute fight sequence takes place on the Alexander Hamilton Bridge in New York City. And while the bridge is a real location, the version seen on screen was a set, created by utilising a combination of a physical location – a parking lot in Atlanta – and a digital backdrop created by Digital Domain.

To create the environment surrounding the bridge, Digital Domain re-created over 2.5 square miles of the city. Nearly everything seen beyond the bridge is CG, including the neighbouring George Washington Bridge, the pedestrian High Bridge, the buildings on either bank of the river, and all of the vegetation present on the surrounding landscape. The VFX team also added several digital humans in the background to populate the scene.

Digital Domain's environment team began with aerial photography, LiDAR, and topographical scans of the area. General building height and footprints were taken from OpenStreetMap and imported into Houdini, and for more detailed and even granular views of the structures, the team used everything available, including Google Maps and Google Street View. Matte paintings were then incorporated for the deeper background.

Using SideFX's Solaris, the artists added all the countless details that breathe life

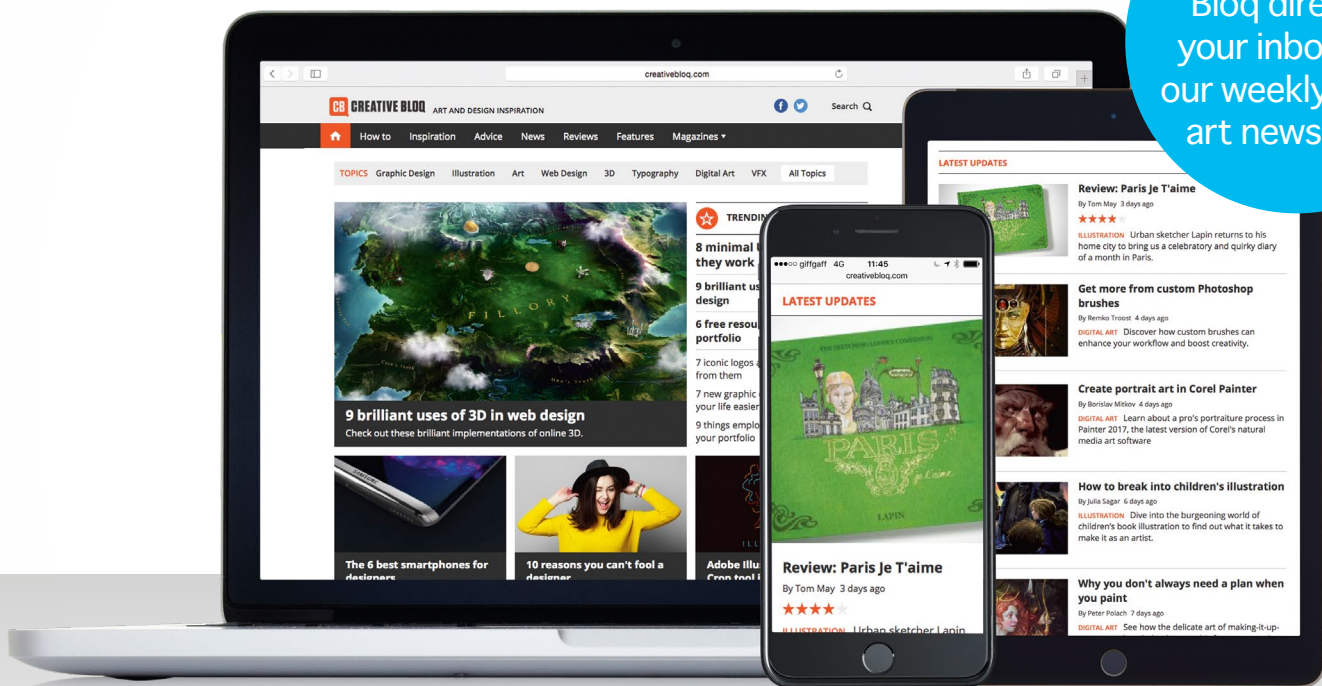
into a digital scene. Thousands of trees were created and introduced into the scene, along with bushes, rocks, signs and much, much more. The Harlem River below was also CG, along with the railroad tracks below the bridge and even the sky above. The environments were then rendered through Solaris in RedShift, while the digital characters were rendered with Maya and V-Ray. Thousands of vehicles were also added to populate each shot, with algorithms created to determine the flow of traffic. In total, the sequence featured over 30 billion polygons rendered.

The goal was to create as much freedom as possible for the filmmakers, which meant giving them flexibility. With a complete, photorealistic recreation of New York City viewable from every angle in a 360-degree rotation, the camera could potentially utilise any angle, even if it differed from the initial storyboards.

Sometimes, the best effects are the ones you don't even realise are effects at all.

The number one destination for **digital art** news, views and how-tos

Get Creative
Bloq direct to
your inbox with
our weekly digital
art newsletter



CB CREATIVE BLOQ

Graphic design

Art

Web design

3D

Digital art

www.creativebloq.com

Reviews

We explore the latest software and hardware tools to see if they are worth your time or money



AUTHOR PROFILE

Paul Hatton

After graduating with a first-class computer science degree, Paul Hatton has spent nearly two decades working within the 3D visualisation industry.

+ PROS

USD support in Bifrost

Updated Boolean modelling workflow

Streamlined retopology workflow

Unreal Live Link for Maya

- CONS

Expensive for anyone with a minimal budget

UNREAL LIVE LINK FOR MAYA

It is now possible to stream your animations directly from Maya to Unreal, all in real time! Talk about seamless working! There is now no need to export your animation from Maya and import it into Unreal.



SOFTWARE REVIEW

Maya 2023



PRICE £246 / \$225 monthly | COMPANY Autodesk | WEBSITE www.autodesk.co.uk

It's that time of year again; the season of product updates for a range of Autodesk packages. This time round we're going to be taking a look at Maya 2023.

Maya has been in existence for nearly a quarter of a century so, understandably, is well established in the 3D world. As with any piece of software that has been around for that length of time, it becomes more and more difficult for any updates to come with that same 'wow' factor as earlier iterations may have done. This is not to say that Maya hasn't delivered a great set of updates, but I'll

need to leave you to judge how 'game-changing' they are for you. Let's dive in and take a look at Bifrost USD, Blue Pencil, an updated Boolean modelling workflow and other changes.

USD SUPPORT IN BIFROST

Maya launched Bifrost in 2019, providing a node-based framework for creating custom effects like fire, snow, explosions and smoke. These effects can be previewed directly in the viewport and rendered with Arnold for Maya. Since its introduction there has been no way to use it with Universal Scene Description (USD) files. This framework

for interchanging computer graphics data was created by Pixar and is thankfully now supported in Bifrost. This support includes the ability to create and edit USD assets directly in the viewport as well as using the Bifrost graph.

This introduction represents a big leap forward in seamless working between USDs, Maya and Bifrost. It is now even easier to create incredible procedurally driven effects with Maya.

UPDATED BOOLEAN MODELLING WORKFLOW

I remember the days of Boolean operations being



Main: This incredible image by Lee Griggs is beautifully created with an unbelievable amount of detail

Left: This playful image by Mohamed Alsadany has a gorgeous aesthetic which really draws the viewer in

"IT IS NOW EVEN EASIER TO CREATE INCREDIBLE PROCEDURALLY DRIVEN EFFECTS WITH MAYA"

terribly unstable, especially for complex meshes. Those days are long gone, but Maya users will still be glad to see that further improvements have been made to the Boolean tools – making it much simpler and more straightforward to carry out these types of operations. You'll now find the Boolean stack an easy central location to edit meshes and see how those changes impact your scene. Each input object is displayed as a separate layer, which makes it even easier to manage the operations.

Alongside this you'll also find some new operations added to the existing set including Slice, Hole Punch, Cut Out and Split Edges.

STREAMLINED RETOPOLOGY WORKFLOW

Into a solid set of retopology tools, Maya has introduced

a new 'preprocessing' tool which lets you convert a mesh to quads without needing to carry out a prior process of converting it to triangles first. This makes it even quicker and easier to go from an unusable mesh to a clean, beautiful-looking result. I'm all for any update to a piece of software that completes steps automatically, especially those that used to be incredibly time-consuming.

BLUE PENCIL

If you're familiar with Maya's Grease Pencil, think of this new Blue Pencil as its superior. Grease Pencil was great but rather limited; this new arrival, on the other hand, is much more user-friendly. In essence, it provides a variety of text and shape tools that give artists the ability to annotate their scenes right in the viewport;

all in a non-destructive way. It also includes a layer system which makes organising annotations much easier and straightforward. It's much more than just a simple annotation tool – the team has worked really hard at making it useful for animators who want to sketch poses across various frames, block out poses and even retime or transform annotations. If you love that sense of getting your hands dirty during your creation process, then this will be a handy tool for you.

3D MODELLING UPDATES

Alongside the updates we've covered so far, Autodesk have also provided a range of changes to Maya's 3D modelling tools. The Multi-Cut tool now shows the percentage amount for the position selected along the edge. In the Sweep Mesh tool, artists can now use either single or multiple creator nodes per curve. The modelling workflow has also been improved, providing new marking menus when extruding and bevelling.

THE VERDICT

8.0
OUT OF 10

MAYA 2023

The popularity of this update will depend on what type of art you create and what workflows you adopt – but all in all, it's a good, solid update that continues to keep Maya at the forefront of the animation and VFX industry.



AUTHOR PROFILE

Paul Hatton

After graduating with a first-class computer science degree, Paul Hatton has spent nearly two decades working within the 3D visualisation industry.

+ PROS

Better retopology tools

Physical Material now Autodesk Standard Surface Compliant

Working pivot updates

- CONS

Lacks any game-changing new features

Subscription prices still out of reach for many people

ARNOLD RENDERING UPDATES

Arnold's rendering plugin has received some updates, including better tri-planar projection. The projection of textures onto surfaces that face in a particular direction has a huge number of applications, including applying different materials to a surface that may attract things falling onto it, such as snow or dust. Arnold now also supports a sheen layer with amount and roughness properties, great for materials like silk and satin.



SOFTWARE REVIEW

3ds Max 2023



PRICE £246 / \$225 monthly | COMPANY Autodesk | WEBSITE www.autodesk.co.uk

3ds Max has had 26 years of development, updates, iterations and new features. Even though, as users, we'd love every update to include new and amazing ground-breaking upgrades, in reality this becomes increasingly unrealistic the more established a piece of software becomes. 3ds Max 2023 includes some really solid updates, but no major new features this time. Let's dive into updated retopology tools, Physical Material, working pivot changes and support for the glTF file format.

RETOPOLOGY

The third iteration update of 3ds Max 2021 saw the introduction of the Retopology plugin. This provided users with a host of tools to make it easier to work with complex and unclean meshes. This update sees an important improvement to the existing modifier by providing the capabilities of pre-processing a mesh. This is an important addition as it makes it possible to not only derive simple and clean meshes from very complex data sets, but also eliminates the requirement to simplify meshes with a variety of other tools and

modifiers such as ProOptimizer or Instant Meshes.

To make use of this, simply add the Retopology modifier, tick Preprocess Mesh and hit Compute. Right before your eyes you'll see your simplified mesh appear. On top of this you can tick Auto Edge to transfer mesh data such as the Mesh Normals and UV mapping. This ensures the UVs from the more complex mesh get transferred perfectly across to the retopologised and simplified mesh. This really simplifies the whole process and as it's just a modifier, you are able to turn it on and off at any time.



Left: George Manolache's render features stunning detail and beautiful material creation for the snake skin

Above: We love this unbelievably realistic piece of art by Guga Baraldi

Below: This stunning VW Camper model by Jake Denham is posed in a way that draws out its beauty



One of the benefits of this new technology would be how it makes working with increasingly complex scanned and photographic geometry not only easier, but also possible to work with.

PHYSICAL MATERIAL

The Physical Material is a layered material that focuses on slotting into a physically based workflow. 3ds Max have now introduced the Autodesk Standard Surface Compliant mode, which ensures these materials in 3ds Max will render identically in Maya and other packages/tools that support this Autodesk specification as well. This will be excellent news for those who work across these types of packages.

This compliance mode, when activated through the Material Mode drop-down menu, will also give artists

access to some additional parameters including 'Thin Film' and 'Sheen'.

WORKING PIVOTS

On the back of the previously released 'Smart Extrude' feature, Autodesk has gone further by providing a set of excellent working pivot updates. The working pivot can be placed easily on any part of the active mesh and then oriented to suit your exact requirements. A grid can also be created directly from a working pivot, which makes adding new meshes to existing faces of a model super easy – especially when it's used in conjunction with Smart Extrude.

These features can be accessed through a dedicated toolbar, and will give artists who do a lot of modelling a small suite of super useful tools

that will drastically improve workflows, and the speed with which meshes can be created and edited.

SUPPORT FOR GLTF FILES

Artists who make use of the glTF file format will be glad to see that it is now supported in 3ds Max 2023. This 3D file format is open source and royalty-free. It supports both static and animated models and is widely used in web applications and games.

This file format is gaining traction in the 3D world and

so 3ds Max's support of it couldn't have come quickly enough. 3ds Max now also includes its own glTF material, which then works seamlessly with the exporter.

This support opens the door for artists to deliver their 3D models to a world of people who don't own 3ds Max but do have access to the web. This will be useful for artists who want to show their progress to clients, or for companies that want to provide online interactive displays of their products.

THE VERDICT

8.0
OUT OF 10

3DS MAX 2023

This update is solid. It includes a good range of incredibly useful changes that will actually help artists in the 3D creation process. There may not be any show-stopping, glitzy features, but 3ds Max is all the stronger for this update.

● Reviews

Wired2Fire Apollo WS video editing workstation



AUTHOR PROFILE

Mark Pickavance

A veteran technology author, Mark first wrote for 3D World in 2002. He's been a commercial animator, games designer, managed automotive CAD, and even published software. www.pickavance.com

+ PROS

Massively powerful CPU

Supporting GPU

Great expansion possibilities

Industry-standard parts

- CONS

Faster Gen4 SSDs are available

SYSTEM SPECIFICATIONS

CPU: Intel Core i9-12900K (16 cores, 24 threads)

GPU: MSI GeForce RTX 3070 Ti Ventus 3X 8GB GDDR6X

Motherboard: Asus Z690-CREATOR WIFI

RAM: Crucial 64GB DDR5-4800 UDIMM (2 x 32GB)

Chassis: Fractal Design Define 7

CPU Cooling: Noctua Dual Tower NH-D15 heatpipe cooler

PSU: Corsair RM850x 850W Gold Rated PSU

Storage: 2TB Samsung 980 Pro SSD, Seagate 4TB BarraCuda hard drive



Above: Even with the MSI RTX 3070 Ti graphics card and NH-D15 Noctua CPU cooler, the Fractal Design Define 7 case offers plenty of room for upgrades



Right: While not the most potent RTX GPU that Nvidia and MSI have made, the RTX 3070 Ti is still a monster



HARDWARE REVIEW

Wired2Fire Apollo WS video editing workstation



PRICE £3,479 / \$4,370 | COMPANY Wired2Fire Ltd | WEBSITE wired2fire.co.uk

After Wired2Fire previously sent us the impressive Artemis workstation, it encouraged us to experience a slightly lower-cost proposition this time aimed at video production workflows.

The Apollo WS continues the spacefaring naming convention. However, instead of the AMD Threadripper technology of the Artemis, it uses the latest Intel platform combined with an Nvidia RTX GPU to offer a punchy editing solution.

In January 2022, Intel unleashed its new Alder Lake platform and a slew of processor options that exploit the extra bandwidth available with DDR5 memory and Gen4 PCIe M.2 storage.

Mounted in the popular Fractal Design Define 7 enclosure and accompanied by an MSI GeForce RTX 3070 Ti Ventus 3X video card, this combination makes for a powerful yet surprisingly quiet solution.

Video editing workflows don't inherently need such a powerful video card. But the increased use of more compute orientated effects in post-processing and greater than 4K resolutions can make having the extra performance remarkably useful. And, if the workstation does other duties that involve CAD, 3D rendering, simulations or game graphics, it won't disappoint.

Even with the RTX 3070 Ti Ventus GPU, the CPU is truly centre stage here, relegating the GPU to the role of best supporting actor.

Wired2Fire has options for Apollo systems with less computing horsepower than the Intel Core i9-12900K processor in our review machine, but they all come with the Asus ProArt Z690-CREATOR WIFI edition motherboard installed.

The Intel i9-12900K is an unusual design sporting 16 cores, split equally into performance and efficiency cores. The efficiency cores aren't hyper-threading, and therefore this chip processes only 24 simultaneous threads.

That might seem a retrograde step over an AMD Zen 3 Threadripper design with 16 cores and 32 threads. But, the efficiency cores allow for more granular control of the heat management in the chip, with each core type being clocked independently.

With a base clock of 3.2GHz, the performance cores can boost to 5.2GHz as required, and the efficiency cores go from a base of 2.4GHz up to 3.9GHz in Turbo mode.

For those curious, it is possible to disable the efficiency cores and then have that unused chip space provide a heat sink for the performance cores to run at higher speeds.

As that last statement infers, this system is mostly about choices, and the Asus ProArt Z690-CREATOR WIFI edition motherboard provides even more with its spectacular feature set.

The highlights include three M.2 PCIe Gen4 slots, with only one occupied by default. It sports two Thunderbolt

"THE CPU IS TRULY CENTRE STAGE HERE, RELEGATING THE GPU TO THE ROLE OF BEST SUPPORTING ACTOR"

4.0 ports, providing greater bandwidth for external storage attachment. Connectivity is also best-in-class, with WiFi 6 and Bluetooth 5.2 functionality preinstalled, alongside the wired networking options of 2.5GbE and 10GbE ports.

For card installations, there are three x16 slots, two being PCIe 5.0 specification and the other PCIe 3.0, and two 1X slots for extra LAN cards for lower bandwidth cards.

The connectivity on offer exceeds that in the Artemis and makes the Apollo a much more flexible solution that would be easier to repurpose.

The one place it might have been better was in the default storage options. The review system came with the top specification Samsung 980 Pro 2TB SSD and a 4TB Seagate hard drive. The Samsung is a good performer, but it was one of the first Gen4 drives, and there are now slightly faster options with even greater TBW (total bytes written) endurance. That last part might be critical

for video editing, as this is one of the workloads that can exhaust NAND-based storage if heavily used.

Thankfully, the spare M.2 slots provide options to use other NVMe drives that would offer a better performance balance with the 980 Pro than the Seagate BarraCuda 4TB, and make cloning the existing system to a faster or bigger NVMe drive easy.

These are minor complaints, and overall, this is a remarkably solid design with an impressive performance profile.

It's also from a company with a solid reputation for constructing solutions from the best possible parts. If the exact specification isn't to your liking, Wired2Fire can customise the build to add more memory, storage and a more powerful GPU. Or, conversely, tone it down for a specific budget.

We thought the Wired2Fire Artemis was one of the best pre-built systems we'd encountered, but the Apollo turned out to be even better.

THE VERDICT

9.0
OUT OF 10

WIRED2FIRE APOLLO WS VIDEO EDITING WORKSTATION

After being outpaced by AMD, Intel roars back with the Alder Lake processors at the heart of the Apollo workstation. When combined with the bandwidth of DDR5 memory, this is a muscular platform for video processing.

AUTHOR PROFILE

Ben Brady

Ben is an artist and illustrator based in Bristol. He works in traditional woodcut, drawing and digital mediums. He reviews drawing tablets and styluses, as well as the latest and greatest digital software for artists, for our website Creative Blog, benjaminbrady.co.uk

+ PROS

Wireless, meaning less desktop clutter

Generously sized drawing surface

Stylus is responsive

- CONS

Stylus not battery-free

No tilt function



HARDWARE REVIEW

Huion Q11K Pen Tablet

PRICE £64 / \$84 | COMPANY Huion | WEBSITE Huion.com

Huion's Inspiroy range offers some perfectly serviceable budget-level tablets, with the Huion Q11K sitting just above its cheapest, mostly due to its wireless capabilities – which needless to say is the Q11K's headline feature, apart from its generous size.

We tried it out using a few different art programs, namely Affinity Photo, Krita, and MediBang Paint Pro, which all responded well. Here are our notes after spending a few days using the Huion Q11K.

GETTING SET UP

Huion's tablets are always a treat to unbox, and the Q11K is no different. Inside is the tablet itself, and three other boxes containing a micro USB to USB-C to charge the tablet, a charger for the pen, and a number of elements that make up the pen holder.

The pen holder, once put together, also houses the spare nibs, nib changer and the wireless USB connector, which all screws together with a nicely weighted bottom, so your pen can sit upright or on its side on your desk.

A quick-start guide also points you towards where to download your driver for installation, which as a process is as simple as can be, and you are directed throughout. Huion really has perfected its

THE STYLUS PEN

Though the majority of pens/styluses are battery free nowadays, there are still one or two that need a charge. It took about an hour to fully charge, though it can be used

"WE TRIED IT OUT USING A FEW DIFFERENT ART PROGRAMS, WHICH ALL RESPONDED WELL"

onboarding process, which means if you're new to drawing tablets this is a good one to start with.

DRAWING SURFACE

The Huion Q11K is quite generous in size for the price range. 11 x 7" is more than you'd get for Wacom in this price bracket for certain. As a surface to draw on it has an ever-so-slight texture to it to mimic paper, but not so much that it inhibits graceful pen movement. The size means you can be a little more expressive in general, allowing you room to move about.

whilst plugged in. The stylus that comes with the Huion Q11K is relatively lightweight, made fully of plastic, and has two customisable buttons on its shaft – though there is no rubber grip.

It's not a bad stylus to work with, the pressure sensitivity levels are 8,192 (up there with the best – though I can't tell the difference between those levels and a stylus with half the amount), and it does not have tilt function (look to the Q11K V2 for that).

The pen works well and is nice to draw with, and is very sensitive so a greater range

in marking is available. For the budget, this is a decent stylus and the extra nibs that come with the package are a welcome addition that not all tablets offer.

DESIGN AND BUILD

The Huion Q11K is a nicely put together tablet, with all the bits and extras you need.

Design wise, the Huion Q11K looks good and has a stylish appearance. It sits nicely on the desk especially when in wireless mode, there being less wires and clutter. There are eight customisable shortcut buttons, which are easy to program in the software UI so you can tailor the buttons to the app you're working with. For instance, you might have different shortcut needs for Krita than you do for the likes of Affinity Designer or Photoshop.

Also within the Huion UI is the ability to change the tablet around if you are left-handed, so the shortcut buttons are on the right. Of course, whether you use them or not is down to



All images on page © Ben Brady

Above: The Huion Q11K has a stylish design, feels well made, and is quick and easy to get set up

personal choice. Some people are just so used to using keyboard shortcuts that they stick with that. Good to have the option, though!

In terms of the build quality it's what you'd expect for the

price. It is mostly plastic, with four rubber feet underneath to stop it slipping about, but overall it feels very solid, and well made.

Once it's charged (the tablet itself took just over two hours to fully charge) you do get a lot of use out of it. I've been using it for three days, about three to four hours at a time, and it still hasn't needed another charge yet.

PRICE

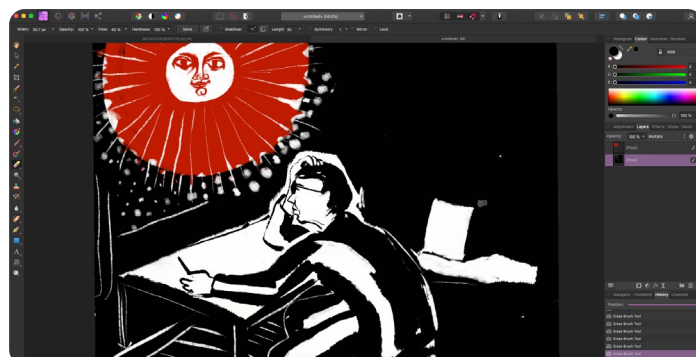
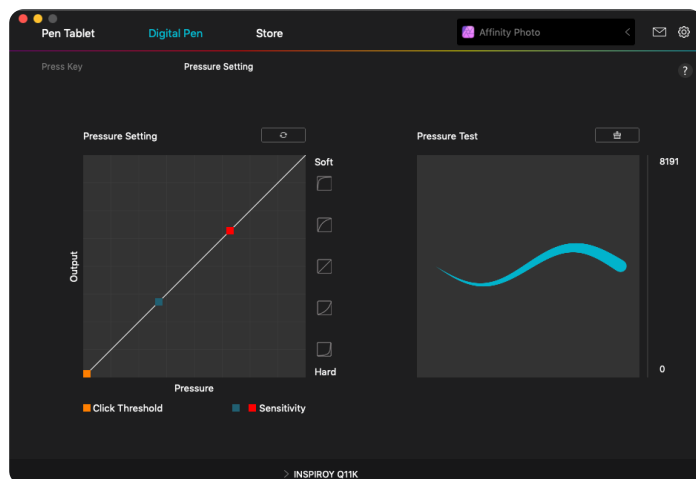
Currently priced at £64/\$84 (usually \$119), there is also a V2 (which sports a 60-degree tilt function) available priced at \$139. For comparison, XP-Pen's similarly sized graphics tablet the Deco LW, which is also wireless, costs £90/\$90. A small Wacom Intuos is currently £90/\$70 (usually \$100), which is Bluetooth capable and the pen is battery free (which the Q11K isn't), but has around half the

levels of pressure sensitivity as the Huion.

SHOULD YOU BUY ONE?

There's no real reason not to consider buying a Huion Q11K if you're looking for a first-time buy or a slight upgrade from something smaller. The wireless aspect is very handy, as it is less cluttered (but it does need charging first), the drawing experience is great and the pen is very sensitive and also customisable to your own hand.

The only downsides I found in use when creating my art and illustrations are that the pen isn't battery free nor does it have the tilt function. However, the size of the drawing area is also worth the price and means more drawing 'real estate' to use. Overall, for the price and quality the Huion Q11K is a good buy if you're new to tablets.



Above: Affinity Photo responds well, and the stylus is as sensitive as you'd hope for

THE VERDICT

7.0
OUT OF 10

HUION Q11K PEN TABLET

It still needs charging to enable wireless use, and the pen has a battery and lacks a tilt function. Yet, the well-made Q11K is recommended as a modest upgrade from anything smaller, and is a very good entry-level drawing tablet.



AUTHOR PROFILE

Jeremy Laird

Jeremy has been writing about technology since the 90nm Netburst era (Google it!) and enjoys nothing more than a serious dissertation on the finer points of input lag and overshoot followed by a forensic examination of advanced lithography. Or maybe he just loves machines that go 'ping!'. creativeblog.com/author/jeremy-laird

PROS

Fantastic 4K screen

Clever dual-hinge ergonomics

Quality engineering

CONS

Heavy and not hugely portable

Last-gen Intel processor

Mediocre battery life

HARDWARE REVIEW

Acer ConceptD 7 Ezel Pro

PRICE £2,900 / \$3,000

COMPANY Acer

WEBSITE Acer.com

It's not quite true to say there's nothing like the Acer ConceptD 7 Ezel Pro, but it is a novel alternative to the clamshell laptop masses. The main attraction is a dual-hinged display. Though not entirely unique, it is very nicely executed and enables a whole new world of ergonomic and input options you probably didn't think existed. Factor in the bundled Wacom EMR input pen and you have an intriguing productivity tool for digital artists and other content creators.

Hinge aside, there's plenty more of interest. The 15.6-inch touchscreen display is full 4K and Pantone Validated. There's also a beefy eight-core Intel CPU, albeit a generation or two old, and proper dedicated Nvidia graphics. This is a true portable workstation, though at around 2.5kg the portability element has been compromised in the quest for functionality.

In terms of competition, there's an entire army of conventional clamshell laptops you can choose from, a few of which have touchscreens. You could, of course, go for a 2-in-1 convertible with a 360-degree hinge and similar support for pen input and inking.

But the only truly comparable device is the Microsoft Surface Laptop Studio, which offers similar, but not quite identical, dual-hinge engineering. As niche as that makes the Acer ConceptD 7 Ezel Pro seem, to try it is to be converted. Why aren't there more machines like this?

FEATURES AND DESIGN

Up front and centre is the 15.6-inch 4K touchscreen mounted on a clever dual hinge. Acer reckons the hinge delivers no fewer than six different usage modes. For starters, there's conventional clamshell laptop and then tablet configurations, albeit this makes for a very large, thick tablet.

And then there's 'Float' mode. It brings the display tangibly closer, and once you've tried it a conventional laptop hinge seems awfully restrictive, especially if you want to use the touchscreen functionality. Cleverly, Acer has engineered in sufficient stiction into the hinge that this mode is usable with the input pen. It's also the main difference between the Acer ConceptD 7 Ezel Pro and the otherwise similar Microsoft Surface Book Studio. Microsoft's portable doesn't do 'floating'.

Speaking of pen and inking, Acer bundles a Wacom EMR pen that is probably slimmer than serious content professionals tend to prefer. But the screen is compatible with other Wacom EMR pens and it definitely works well with the slightly matte screen surface to give that critical element of resistance most digital artists will appreciate. Like all EMR pens, it takes



All images © Acer

“THIS CLEVER DUAL-HINGED LAPTOP IS BEAUTIFULLY BUILT AND LEAVES YOU WONDERING IF THIS KIND OF USABILITY SHOULD BECOME THE NEW NORM”

its power from the display itself and so doesn't require charging. It also slots neatly into a storage bay in the side of the chassis.

As for the screen itself, it's a 15.6-inch 4K touchscreen item with fully 3,840 by 2,160 pixels and rated at a fairly punchy 400 nits. To some, the panel's Pantone validation will imply superior colour accuracy. But in practice, Pantone is based on a reflective model of colour and so entails a necessarily smaller colour space than emission-based gamuts like Adobe RGB and DCI-P3. Long story short, it's not hugely relevant for content like video and images, instead it's useful for workflows that involve printing. That said, Acer says the panel is good for 100% coverage of Adobe RGB, so it is up to some fairly serious content creation on the move.

Some other design and engineering highlights include the keyboard, which has a very solid bed and is pleasant to type on, even if the amber-coloured backlighting is useless actually identifying the keys. For our taste, the trackpad is also slightly on the small side.

As for core components, our review unit came with an older eight-core 10th Gen Intel

Core i7 processor and Nvidia's GeForce RTX 2070 graphics. But you can opt for newer Intel 11th Gen processors and Nvidia 30 series graphics. Intel's very latest 12th Gen chips aren't yet available with this device, though you do get 1TB of NVMe SSD storage and 16GB of RAM.

Connectivity wise, the main ports and sockets are all located on the sides of the chassis rather than the rear due to the hinge engineering. On the left, you get a pair of USB Type-C ports with full Thunderbolt 4 support, plus a single USB-A socket and an audio jack. On the right, there's a further USB-A port, plus HDMI, a full-sized DisplayPort socket, Ethernet and then the barrel-type power connector.

PERFORMANCE

In isolation, this is a punchy portable powered by an eight-core Intel CPU and proper dedicated graphics. Problem is, as reviewed here it's based on technology that's a generation or two old. That said, with 16GB of RAM and a speedy NVMe SSD, the Acer ConceptD 7 Ezel Pro has plenty of performance for image editing on the move. It's also quick enough for some



Above: Acer has bundled a Wacom EMR pen for touch input and inking

light video production. We just wouldn't choose it as a primary portable video encoding rig. You can get much more performance for less money if that is your main concern.

Speaking of image editing and related content creation, the 15.6-inch 4K panel is a peach. The default calibration is lovely, with bold but accurate colours, great viewing angles and epic pixel density. The only slight snag is the surface sparkle and grain of the matte coating for the touch input. It's only just visible, but it does very slightly detract from the screen's sharpness and clarity.

If you're planning on making lots of use of the touch and inking capability, it's also worth bearing in mind that the display is limited to 60Hz. A higher refresh rate of 120Hz, which the Microsoft Surface Book Studio offers, would be preferable in latency terms.

As for the battery life, around six hours of video playback is your lot and even less with more demanding apps. Many higher performance PC laptops can

beat that easily, let alone Apple's latest MacBook Pros which can last well over twice as long, maybe even three times. Of course, you don't get a dual-hinge and inking support on any MacBook.

SHOULD YOU BUY ONE?

If all you want is lots of performance in a portable package, ignore the Acer ConceptD 7 Ezel Pro and go for a conventional clamshell system. From a pure image and video editing perspective, it's not hugely convincing. It's also a hefty old thing at 2.5kg, especially in tablet mode, and has mediocre battery life. Oh, and an upgrade to the latest Intel CPU tech wouldn't hurt.

And yet, if you're looking for something a bit special for content creation and digital artwork, this clever dual-hinged laptop is beautifully built, gives you a whole new world of ergonomic options, and leaves you wondering if this kind of usability should become the new norm for desktop replacement laptops. It's that good.

Right: The Acer ConceptD 7 Ezel's 'floating' screen mode is a genuine delight



THE VERDICT

8.5
OUT OF 10

ACER CONCEPTD 7 EZEL PRO

It's very nicely engineered, cleverly executed, and the dual hinge genuinely adds a whole new world of ergonomic options that digital artists will love. Once you've tried it, you might not want to go back to a plain old clamshell portable.

BACK ISSUES

Missing an issue of 3D World?
Fill the gaps in your collection today!

ISSUE 286 JUNE 2022 DIGITAL HUMANS

- Create photorealistic characters with our tutorial guides
- Delve behind the VFX of *Spider-Man: No Way Home*
- Model a mech Part 3 – create your own custom HDRIs
 - Sculpt original creature designs in ZBrush
- Will off-the-shelf assets kill or bring life to the industry?
- **Downloads** Free models and textures, files and more!



ISSUE 285 MAY 2022

UNREAL LIGHTING

- Craft dynamic characters with Unreal Engine 5
- Explore an exciting, open-world *Matrix* experience
- Model a mech Part 2 – how to rig a multi-jointed robot leg
- VFX supervisor Kevin Baillie talks working with Robert Zemeckis
- **Downloads** Free models and textures, files and more!



ISSUE 284 APRIL 2022

CREATE A RENDER IN LOW-POLY

- Transform a 2D sketch into a low-poly 3D render
- Beginner's guide to kitbashing, with advice from the experts
- Behind the scenes on Pixar's *Automaton* short
- Model a mech in Part 1 of a new tutorial series
- **Downloads** Free models and textures, files and more!



ISSUE 283 MARCH 2022

NEW YEAR, NEW SKILLS

- Grow your CG toolset with our software guide
- We explore the gorgeous 3DCG visuals of anime film *Belle*
- Learn how to speed up your workflow for personal projects
- How to optimise game assets for Unreal Engine
- **Downloads** Free models and textures, files and more!



ISSUE 282 FEBRUARY 2022

HOW TO BECOME A MOBILE MONSTER

- Learn how to sculpt incredible creatures with Nomad Sculpt
- Veterans of the *Harry Potter* movies take a look back at the game-changing franchise's huge impact on London's VFX industry
- We explore the exciting new tech that is changing how we work
- **Downloads** Free models and textures, files and more!

CATCH UP TODAY!

Visit Apple Newsstand, Pocketmags and Zinio stores to download a back issue of 3D World to your tablet or computer.



ISSUE 281 JANUARY 2022
BLADE RUNNER MEETS CG ANIME

- Delve into the stunning CG animation of *Black Lotus*
- We interview female artists working at top studios, including Aardman and Framestore, about their experiences
- Behind the scenes of *No Time To Die*'s action-packed VFX
- **Downloads** Free models and textures, files and more!



ISSUE 280 CHRISTMAS 2021
CREATE STUNNING FAN ART

- This month's cover artist breaks down his workflow process
- We explore Unreal Engine with advice and tutorials from the pros
- Discover the incredible VFX of sci-fi blockbuster *Dune*
- Digital Domain talk creating cinematic-quality TV series
- **Downloads** Free models and textures, files and more!



ISSUE 279 DECEMBER 2021
THE VFX OF FOUNDATION

- Get the lowdown on the Apple TV+ sci-fi series *Foundation*
- Inside Blue Zoo: Part 5, exploring the exciting future of real-time tech
- Stage and compose a shot with Pixar's layout artist
- Get started in VR: how to utilise this immersive creative medium
- **Downloads** Free models and textures, files and more!



ISSUE 278 NOVEMBER 2021
STYLISED SCENES

- Work with toon shaders to produce an amazing stylised scene
- Inside Blue Zoo: Part 4, delving into lighting and comp workflows
- The secrets behind the VFX of *Those Who Wish Me Dead*
- We test, rate and review a range of quality ultra-wide monitors
- **Downloads** Free models and textures, files and more!



ISSUE 277 OCTOBER 2021
LUCA

- We explore the gorgeous underwater visuals of Pixar's *Luca*
- Inside Blue Zoo: Part 3, how to overcome the challenges of storytelling on a budget
- Go behind the scenes of sci-fi drama *Intergalactic*
- How to sculpt fan art in Blender
- **Downloads** Free models and textures, files and more!



ISSUE 276 SEPTEMBER 2021
LOOK DEV LESSONS: NAIL YOUR STYLE

- Inside Blue Zoo: Part 2, a special behind-the-scenes look at the company's unique animated projects
- Take a deep dive into the world of indie film production
- Discover how the fantasy universe of videogame *Unbound: Worlds Apart* is brought to life
- **Downloads** Free models and textures, files and more!



ISSUE 275 AUGUST 2021
MASTER YOUR CONCEPT ART

- Use Gravity Sketch to create incredible sci-fi concept art
- Inside Blue Zoo: Part 1, our new series exploring the workings of the renowned animation company
- Behind the scenes of horror drama *Lovecraft Country*
- Model photorealistic humans
- **Downloads** Free models and textures, files and more!



ISSUE 274 JULY 2021
ZBRUSH SCULPTING HEROES

- Experts from the world of toy and figure creation reveal their tips and tricks for succeeding in the industry
- VFX powerhouse Absolute deliver a character modelling tutorial
- Explore the action-packed VFX of *Godzilla vs. Kong*
- Create amazing scenes in Unreal
- **Downloads** Free models and textures, files and more!

APPLE NEWSSTAND bit.ly/3dworld-app
 POCKETMAGS bit.ly/pocket3D ZINIO bit.ly/3dw_zinio



Future PLC
Quay House, The Ambury, Bath BA1 1UA

Editorial

Editor **Rob Redman**
rob.redman@futurenet.com

Designer **Ryan Wells**
Production Editor **Rachel Terzian**

Contributors

Glen Southern, Mike Griggs, Pietro Chiovaro, Antony Ward, Trevor Hogg, Paul Hatton, Guilherme Luis de Oliveira Silva, Ellie Cooper, Vahid Ghobadi Arfai, Mark Pickavance, Jason B Milligan, Ben Brady, Jeremy Laird

Creative Bloq

Editor **Kerrie Hughes**

Advertising

Media packs are available on request
Chief Revenue Officer **Zack Sullivan**
UK Commercial Sales Director **Clare Dove**
Advertising Sales Manager **Mike Pyatt**
Account Sales Director **Matt Bailey**

International Licensing and Syndication

3D World is available for licensing and syndication.
To find out more contact us at licensing@futurenet.com
or view our available content at www.futurecontenthub.com
Head of Print Licensing **Rachel Shaw**

Subscriptions

New orders www.magazinesdirect.com / 0330 333 1113
Email enquiries help@magazinesdirect.com
Renewals www.mymagazine.co.uk / 0330 333 4333
Renewals enquiries help@mymagazine.co.uk
Acquisitions Director **Sharon Todd**

Subscription delays:

Disruption remains within UK and International delivery networks. Please allow up to 7 days before contacting us about a late delivery to help@magazinesdirect.com

Circulation

Head of Newstrade **Tim Mathers**

Production

Head of Production **Mark Constance**
Senior Production Manager **Matt Eglinton**
Senior Ad Production Manager **Jo Crosby**
Digital Editions Controller **Jason Hudson**
Production Manager **Nola Cokely**
Ad Production Coordinator **Peter Burton**

Management

Group Art Director **Warren Brown**
Content Director **Chris George**
Brand Director **Stuart Williams**
Commercial Finance Director **Dan Jotcham**

Printed by William Gibbons & Sons Ltd, 26 Planetary Road, Willenhall, West Midlands, WV13 3XB

Distributed by Marketforce, 5 Churchill Place, Canary Wharf, London, E14 5HU www.marketforce.co.uk Tel: 0203 787 9001

ISSN 1470-4382

3D World (ISSN 1470-4382) July, Issue 287, is published monthly with an extra issue in November by Future Publishing, Quay House, The Ambury, Bath, BA1 1UA, UK.

The US annual subscription price is \$194.87 Airfreight and mailing in the USA by agent named World Container Inc., c/o BBT 150-15 183rd St, Jamaica, NY 11413, USA

Application to Mail at Periodicals Postage Prices is Pending at Brooklyn NY 11256.

POSTMASTER: Send address changes to 3D World, World Container Inc., c/o BBT 150-15 183rd St, Jamaica, NY 11413, USA

Subscription records are maintained at Future Publishing, c/o Air Business Subscriptions, Rockwood House, Perrymount Road, Haywards Heath, West Sussex, RH16 3DH, UK

All contents © 2021 Future Publishing Limited or published under licence. All rights reserved. No part of this magazine may be used, stored, transmitted or reproduced in any way without the prior written permission of the publisher. Future Publishing Limited (company number 2008885) is registered in England and Wales. Registered office: Quay House, The Ambury, Bath BA1 1UA. All information contained in this publication is for information only and is, as far as we are aware, correct at the time of going to press. Future cannot accept any responsibility for errors or inaccuracies in such information. You are advised to contact manufacturers and retailers directly with regard to the price of products/ services referred to in this publication. Apps and websites mentioned in this publication are not under our control. We are not responsible for their contents or any other changes or updates to them. This magazine is fully independent and not affiliated in any way with the companies mentioned herein.

If you submit material to us, you warrant that you own the material and/or have the necessary rights/permissions to supply the material and you automatically grant Future and its licensees a licence to publish your submission in whole or in part in any/all issues and/or editions of publications, in any format published worldwide and on associated websites, social media channels and associated products. Any material you submit is sent at your own risk and, although every care is taken, neither Future nor its employees, agents, subcontractors or licensees shall be liable for loss or damage. We assume all unsolicited material is for publication unless otherwise stated, and reserve the right to edit, amend, adapt all submissions.



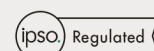
Future plc is a public company quoted on the London Stock Exchange (symbol: FUTR) www.futureplc.com

Chief executive **Zillah Byng-Thorne**
Non-executive chairman **Richard Huntingford**
Chief financial officer **Penny Larkin-Brand**

Tel +44 (0)1225 442 244



We are committed to only using magazine paper which is derived from responsibly managed, certified forestry and chlorine-free manufacture. The paper in this magazine was sourced and produced from sustainable managed forests, conforming to strict environmental and socioeconomic standards. The manufacturing paper mill and printer hold full FSC and PEFC certification and accreditation.



IN THE VAULT

FREE RESOURCES

Follow the link to download your free files
<https://bit.ly/3D-world-unreal5>

**MODELS
AND TEXTURES
EVERY MONTH**

Download these models and textures to use in your own projects



MODELS + TEXTURES

FREE ASSET DOWNLOADS

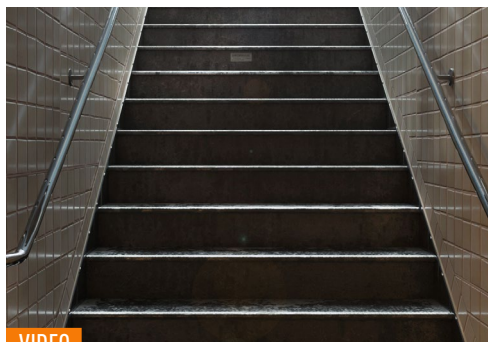
Download a set of fantastic textures from **3dtotal** and build your own asset library with these incredible free 'furniture' models from **CGAXIS** in our monthly model and texture giveaway.



SCREEN GRABS + VIDEO

MODEL A MECH WITH MAYA

Follow along with Vahid Ghobadi's tutorial with his accompanying video guide.



VIDEO

CREATE A TILE MATERIAL

Pietro Chiovaro demonstrates how to make a tile material using Substance Designer.

ISSUE 288



NEXT MONTH

Go behind the scenes of DreamWorks Animation's *The Bad Guys*

ON SALE 21ST JUNE

Subscribe today: www.bit.ly/3dworld-sub



**THE
BRAIN
TUMOUR
CHARITY**

A CURE CAN'T WAIT

BRAIN TUMOURS MOVE FAST. WITH YOUR HELP, WE CAN TOO!

We're working to create a future where brain tumours are curable.
We urgently need your help to accelerate research.

Text DEFEAT5 to 70507 to donate £5, please help us to find a cure.

thebraintumourcharity.org

© The Brain Tumour Charity 2020. Registered Charity in England and Wales
(1150054) and Scotland (SC045081)

FR Registered with
**FUNDRAISING
REGULATOR**

FGT3D FOX CHALLENGE

March 22nd - June 5th, 2022 (UTC+8)

©Grace Tran & Kristina Perinskaya

THEME: Fox

What does a **Fox** look like in your eyes?

It may be adorable, cunning or witty.

Set your imagination free, create **a unique 3D Fox!**

Besides the grand prizes, all works also have a chance to be the mascot of Fox Renderfarm, representing us to meet friends around the world!

More info:

<https://www.foxrenderfarm.com/>

SPONSORS



MORE

RENDER SERVICE SPECIAL OFFER

Each participant can get a free \$50 render coupon!

RENDER CREDIT

US\$50

Coupon Code

3DWFOX285A

FREE